MARCH 1956
VOL. LI No. 3

41.8
M69

VETERINARY Medicine

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features in this issue...

Field Evaluation of Ascaricides in Swine

Advances Made in Swine Practice, Part V

Studies on Micrococcal Mastitis

Veterinary Medicine in India

Pancreatic Dornase in Infectious Bovine Rhinotracheitis

Cardioplasty for Achalasia in the Dog

Effect of Cortisone, ACTH, and Vitamin B_{12} on Distemper in Ferrets

Topical Use of Tetracycline in Eye, Ear, and Skin Conditions in Small Animal Practice

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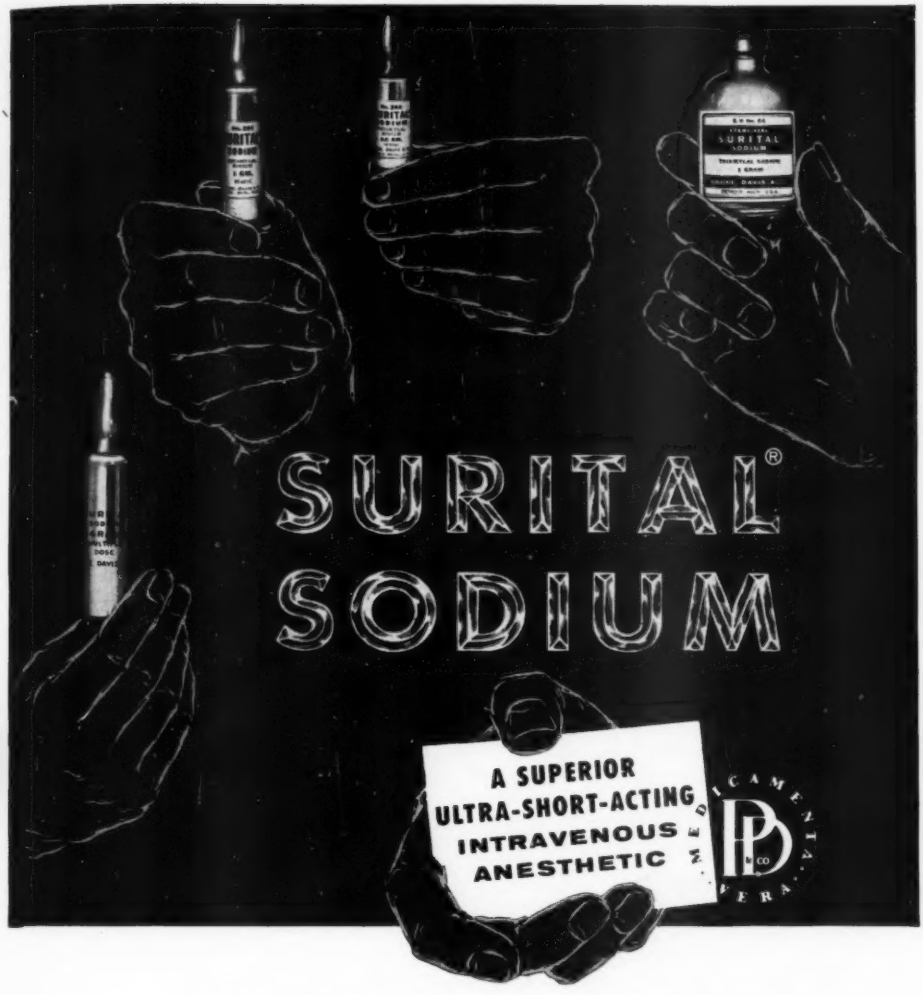

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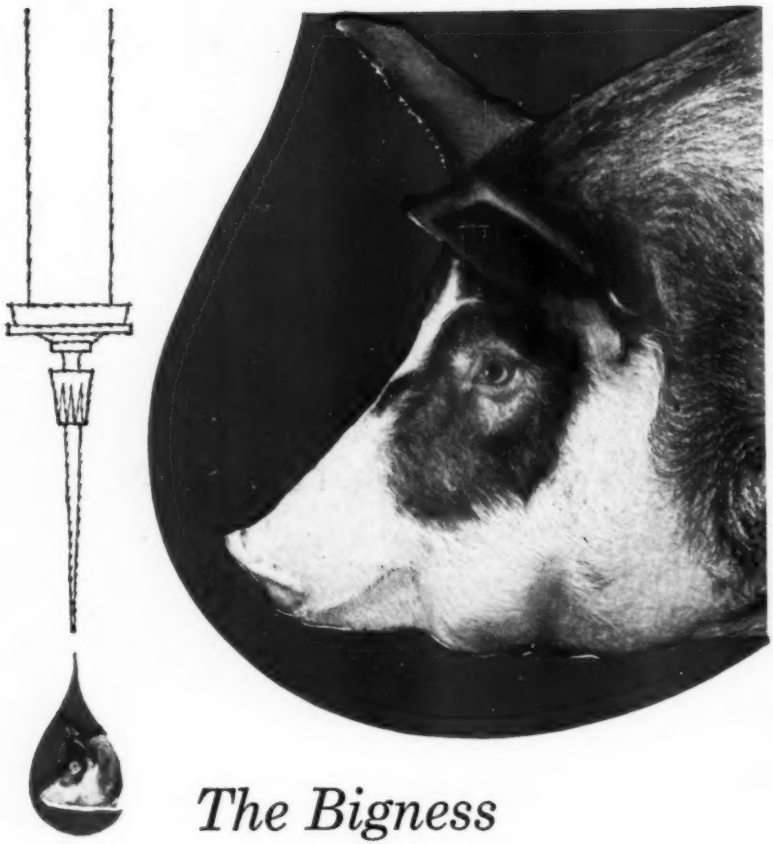

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References: 1. Brown, A. L., et al.: Vet. Med. 50:167, April 1955. 2. Agricultural Research Service, Losses in Agriculture, June 1954, Table 20, p. 129.

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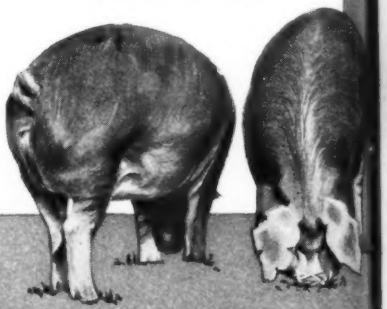

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Expanding Use of Medicated Feeds

The Symposium on Medicated Feeds sponsored by the Food and Drug Administration, Department of Health, Education, and Welfare, held late in January at Washington, D. C. attracted 350 registrants representing drug manufacturers, feed manufacturers, veterinarians, feed control officials, farm groups, and research scientists. In all 29 technical papers were presented.

Drug additives to feeds have concerned veterinarians since coccidiostats were first added to poultry feeds in the 1930's. The idea presented a multitude of problems then, and still does, ranging from economics of livestock production to those concerned with public health. The tremendous extension in the use of medicaments as additives to feedstuffs was emphasized by one speaker who stated that enough antibiotics were sold for animal consumption in 1954 to supplement almost three-fourths of all manufactured feed, a $4,000,000,000 industry. Others estimated that half or more of all feed-lot cattle are now getting diethylstilbestrol with their feed—after only one year of the introduction of this product.

Feed and drug manufacturers must assume the responsibility to growers, feeders, and to the consuming public for additives in livestock feed. Different classes of livestock are handled under varied husbandry practices. Efficacy determined in the laboratory or under a specific set of field conditions cannot always be repeated under different management practices or on different flocks and herds. Considering the potency of products involved, possible adverse effects on livestock health are portentous.

Use of drugs and feed containing potent agents by livestockmen is often overdone. A variety of pathological processes may result from such misuse or overuse including disorders of the digestive tract, blood and vascular system, hormone imbalance, and others that on occasions present puzzling clinical problems.

Medicated feeds admittedly have a place in the modern system of livestock production and offer many advantages. However, there are obvious disadvantages to all concerned in indiscriminate use. There is much that may be said for the rationale of selection of cases. The practitioner must evaluate the feeding program as an important factor in the health of the animals of his clients. There can be no gainsaying the value of an accurate diagnosis prior to use of many medicated feeds designed for treatment of specific, infectious diseases.

VETERINARY Medicine

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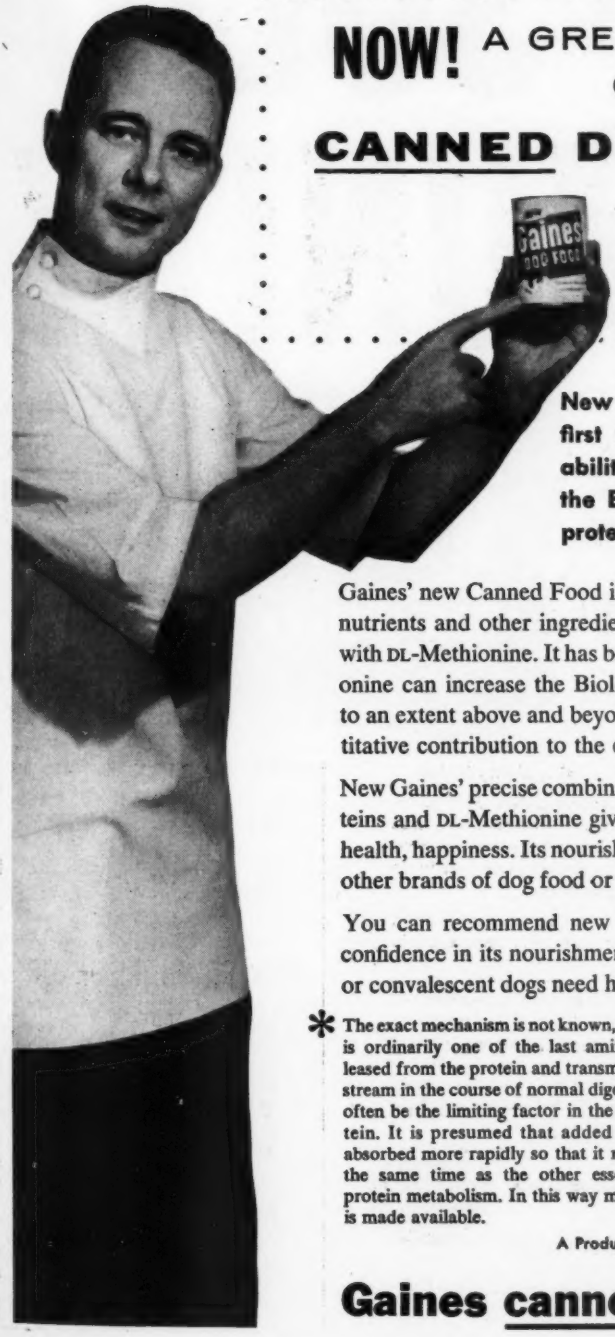

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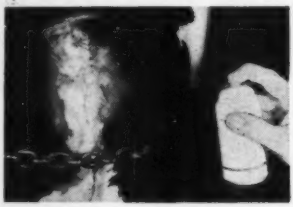
TEAT SURGERY—After teat wall is closed, wound is sprayed with Aeroderm. Plastic dressing is also used to seal the flange of teat cannula in place.[1]



PROLAPSE OF THE VAGINA—Surgical closure of upper portion of vulva with wire sutures is dressed with Aeroderm, minimizing fecal contamination during healing.[1]

TAIL SURGERY—Docked tail of 4-month-old pup is dressed with Aeroderm to avoid injury by licking and to keep wound clean. (Photo courtesy Dr. R. E. Miller, Richmond, Indiana.)

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Aeroderm is sterile and can be taken on calls conveniently. Cost of dressing as applied is about ½ cent per square inch.

1. Conner, G.H.: Vet. Med. 50:259 (June) 1955.
2. Watts, R.E.: J.A.V.M.A. 125:40 (July) 1954.
3. Wendt, W. E.: Personal communication (Sept.) 1954.
4. Choy, D.S.J., and Wendt, W.E.: U.S. Armed Forces M.J. 3:1241 (Sept.) 1952.

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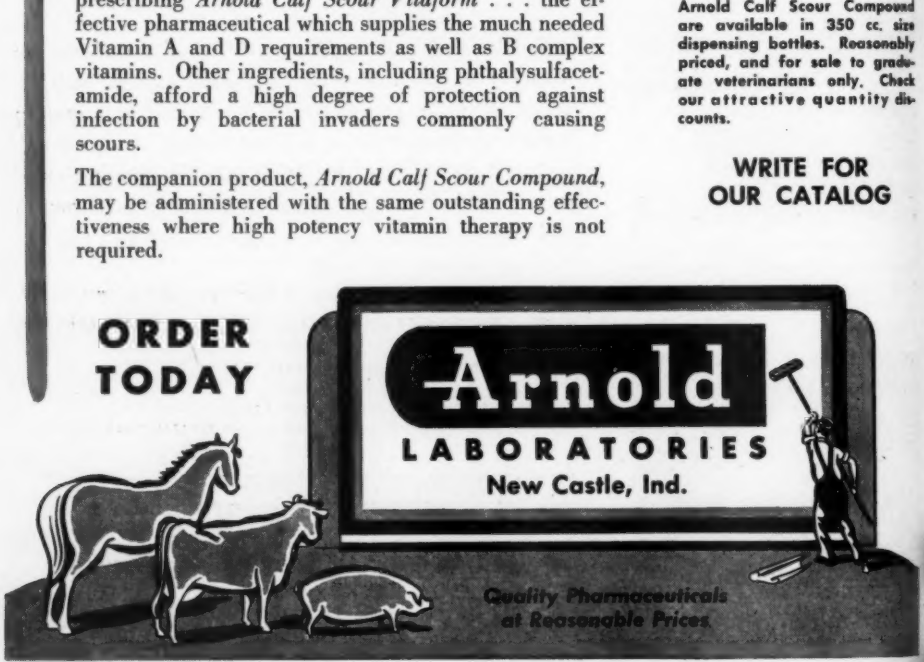

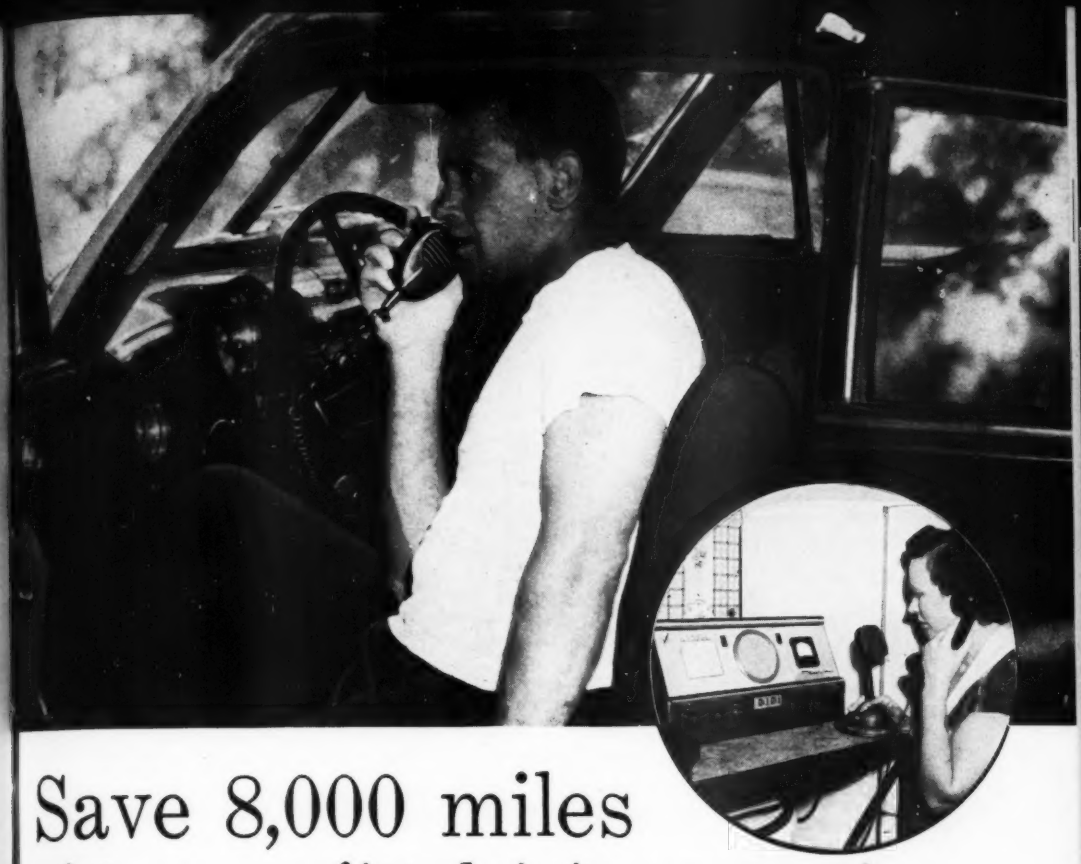

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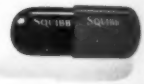

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Calf Scours	Infectious Canine Hepatitis	Pyelonephritis
Calf Diphtheria	Lamb Diarrhea	Septic Sore Throat
Canine Distemper (Secondary Infection Of)	Laryngitis	Septicemia
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Colitis	Meningitis	Surgical Prophylaxis
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- **crosses the intact meningeal barrier more readily.**
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*Newcomer, V. D., Wright, E. T., and Sternberg, T. H.: Antibiotics Annual 1954-55, New York, Medical Encyclopedia, Inc., 1955, p. 686.

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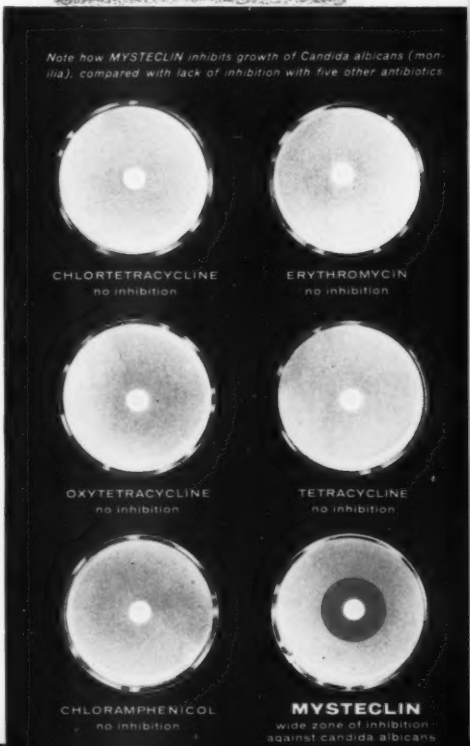

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WHAT WILL IT DO?

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By supplementing the hormone secreted by the parathyroid glands. This calcium-raising action of Parterol is produced by mobilizing calcium stored in the bones and increasing the absorption of calcium from the intestinal tract.

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2. **As a primary treatment for swine bacterial enteritis in herds showing no systemic reaction.**
3. **As a complementary treatment for swine bacterial enteritis in herds showing systemic reactions.**
4. **To minimize relapses.**
5. **To minimize stunting effects following the outbreak of systemic diseases.**

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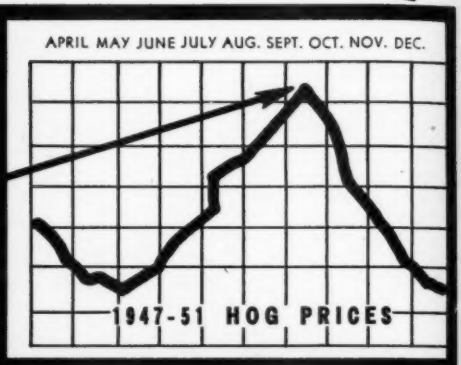

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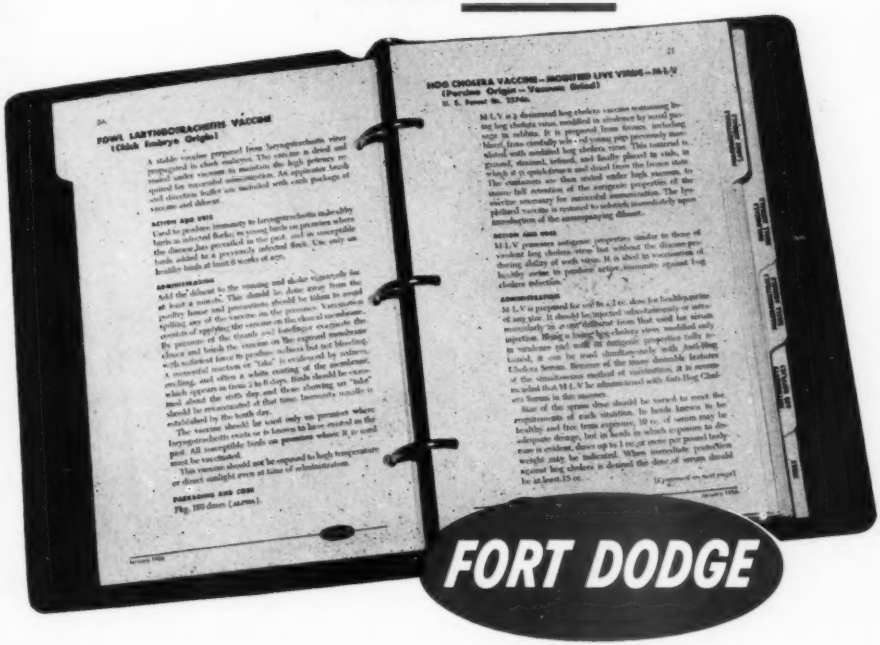

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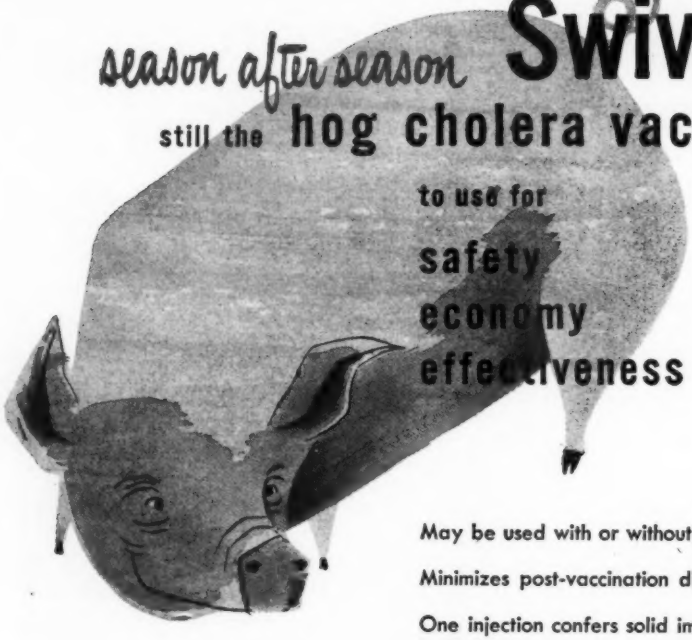

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A Field Evaluation Of Ascaricides In Swine

GEORGE W. KELLEY, Ph.D., LELAND S. OLSON, Ph.D., and VERNON GARWOOD, M.Sc., Lincoln, Nebraska

THE usefulness of an anthelmintic depends upon: (1) The manner in which it must be administered, (2) its toxicity to the host animal,(3) its ability to remove both immature and mature parasites, and (4) its cost. Medicaments that can be mixed into feed or drinking water are more practical for treatment of herds of livestock than those that must be administered individually. Treatment of parasitism must justify its cost. This cost may be offset by additional production of the animals being treated and in reduced parasitism of future inhabitants of the premises.

New ascaricides which are available and recommended for treating ascariasis of swine include: Cadmium anthranilate, cadmium oxide, piperazine adipate, and betaine of 1-piperazine carbodithioic acid.

Since these compounds have only recently been placed on the market, comparative information concerning them is meager. The following report gives the results of a field trial designed to compare the usefulness of cadmium anthranilate*, piperazine adipate**, parvex®, sodium fluoride, and skim milk as ascaricides for swine.

Spindler and Zimmerman[1] reported that many ascarids were eliminated from swine when skim milk was substituted for feed and water for three days. Haberman *et al.*[2] found that when sodium fluoride was fed to swine as 1% of a 24-hour ration it removed 97% of the ascarids. Sodium fluoride has been used widely as an ascaricide because it is effective and easy to administer. Its potential toxicity, however, has discouraged its use at times.

Guthrie[3] found cadmium anthranilate an effective ascaricide which removed 98% of the ascarids from swine when it was fed as 0.066% of the ration for three consecutive days. He stated that this compound was less toxic than sodium fluoride and could be fed at ten times the therapeutic level (0.666%) for several days without harm. Since cadmium accumulates in the tissues of the liver and kidneys, he recommended that swine so treated be held for 30 days before they are slaughtered to allow the accumulation of the cadmium to be excreted.

The piperazine compounds were introduced as ascaricides in 1947 when Hewitt *et al.*[4] discovered the action of 1-diethylcarbamyl-4-

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From the Department of Animal Pathology and Hygiene, University of Nebraska, Lincoln. Published with the approval of the director as paper No. 728, Journal series, Nebraska Agricultural Experiment Station.

This investigation was supported in part by a grant-in-aid from The Upjohn Company, Kalamazoo, Mich. and the piperazine adipate was supplied through the courtesy of Coopers & Nephews Ltd., Chicago, Ill. Pigs used in this study came from the Nebraska Project of the Regional Swine Breeding Laboratory, and we wish to acknowledge the assistance of Cecil T. Blum, the leader of this project.

*Cadmium anthranilate is distributed as Dr. Hess Cadmium Hog Wormer by Dr. Hess and Clark Company, Ashland, Ohio.

**Piperazine adipate is distributed in the United States by Coopers and Nephew Ltd., Chicago, Ill. and by Carson Chemicals Inc. Brownsville, Tex.

®Parvex is a registered name applied to a product containing betaine of 1-piperazine carbodithioic acid and is distributed by The Upjohn Company, Kalamazoo, Mich.

methyl piperazine against ascarid infections in dogs. Fayard[6] reported that piperazine effectively removed *Ascaris lumbricoides* from man. Mouriquand *et al.*[8] found that piperazine hydrate removed the oxyurids of mice, and successfully used it to treat pin worm infections of children. Hartley[7] found piperazine adipate effective against several different species of round worms. Sloan *et al.*[9] examined the anthelmintic properties of 40 different piperazine compounds and concluded that piperazine adipate had the most desirable characteristics for veterinary applications. Polymeric-piperazine-1-carbodithioic acid was reported by Leiper[9] to be effective in removing *A. suum* and *Oesphagostomum dentatum* from pigs. This compound breaks down into piperazine and carbon disulfide in the acid medium of the stomach. Since carbon disulfide and piperazine both have anthelmintic activity, this characteristic may enhance its efficiency.

An outstanding characteristic of many of the piperazine compounds is that they are relatively non-toxic to higher animals. Gurd[10] found that polymeric piperazine-1-carbodithioic acid had an acute oral LD_{50} of 5,000 mg./kg. in mice. Piperazine adipate was found, by Cross *et al.*[11] to have an LD_{50} of 11,400 mg./kg. in mice when given orally. The LD_{50} for sodium fluoride in white mice is 250 mg./kg. orally.

Methods and Materials

The anthelmintics were administered to pigs ranging from 90 to 120 days of age and weighing from 60 to 100 lb. The pigs were part of the swine herd at the North Platte Experiment Station, University of Nebraska. They were in seven lots on alfalfa pasture for the convenience of the breeding program. Each lot was about 1.2 acres and contained 36 to 78 pigs. The number, size, weight and treatment

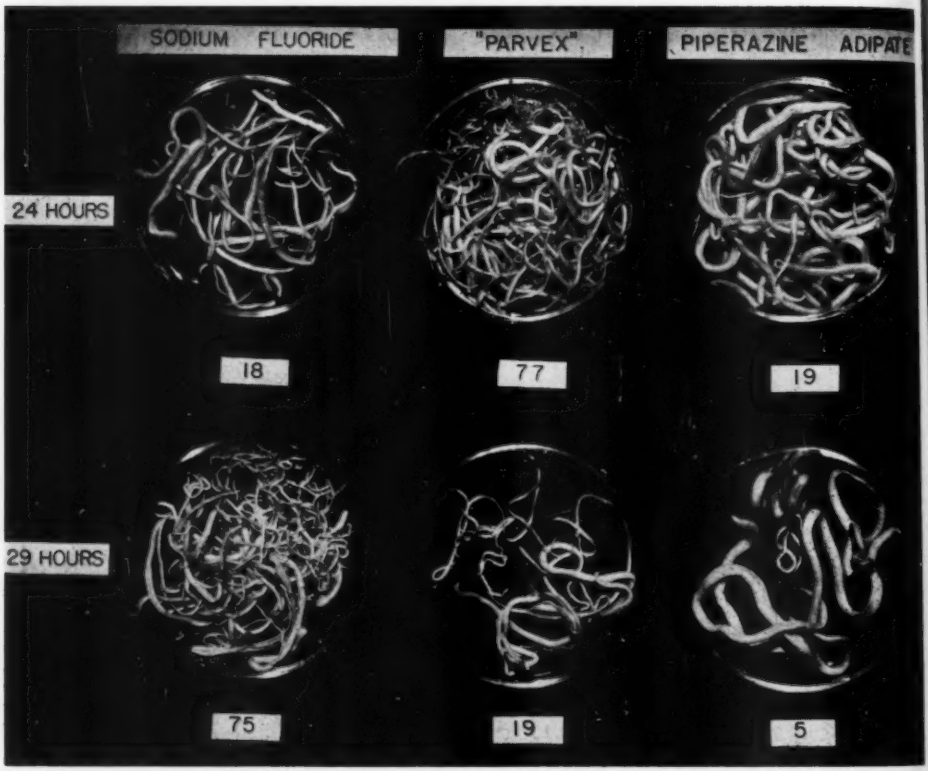


Fig. 1. Ascarids recovered from quart samples of feces randomly collected from the lots treated with sodium fluoride, parvex and piperazine adipate 24 and 29 hours after administering treatments. The numbers under the dishes indicate the number of worms in the dish. The pigs in the lot treated with piperazine adipate were a few weeks older than those in the other two lots and had fewer and larger worms. Egg-count data indicated that piperazine was as efficacious as parvex and sodium fluoride. See table 3 for further details.

TABLE 1. The Number of Pigs in Each Lot, Their Size and Treatment Administered

Lot	Treatment	No. pigs	Av. Wt.	Rate of medication of active ingredient
1	Untreated controls	78	98.6	
2	Cadmium anthranilate	63	98.6	0.044% of feed 3 days†
3	Piperazine adipate	42	100	617 mg./kg. body wt.
4	Untreated controls	57	91	
5	Sodium fluoride	61	88.8	1% of feed 24 hrs.
6	Parvex	36	67	123.2 mg./kg. body wt.††
7	Skim milk	62	61	Entirely replaced dry feed and water for 3 days

†Dr. Hess Cadmium Hog Wormer, used in this trial is 4.4% cadmium anthranilate and 95.6% inert ingredient. One pound of the "Hog Wormer" was added to 100 lb. of feed resulting in a mixture containing 0.044% cadmium anthranilate.
††Parvex contains 22% betaine of 1-piperazine carbodithioic acid, thus when animals are receiving the recommended dose rate of 560 mg./kg. body weight they are getting 123.2 mg. active ingredient per kg.

of the pigs in each of the seven lots appear in table 1.

Cadmium anthranilate, piperazine adipate, parvex, sodium fluoride and skim milk were evaluated for the following properties: (1) Ease of administration, (2) toxicity to the host, (3) efficiency in removing ascarids, and (4) cost of the treatment.

The medicaments were administered by mixing them with the feed as recommended by the manufacturers. The pigs in lot 2 received cadmium anthranilate for three days at the rate of 0.044% of the total dry ration. Piperazine adipate was mixed into one-fourth of the daily ration and fed at the rate of 617 mg./kg. body weight based on the average weight of the pigs in lot 3. The ration of the pigs in lot 5 was mixed to contain 1% sodium fluoride. Two hundred pounds of this mixture was fed during a 24-hour period. Parvex was fed in one-fourth of the daily ration at the rate of 560 mg./kg. body weight based on the average weight of the pigs in lot 6. Because 78% of parvex is inert vehicle, the above dose represents 123.2 mg./kg. of betaine of 1-piperazine carbodithioic acid. The total dry ration and drinking water was replaced by skim milk for three days in lot 7. Dry feed was withheld from all of the lots for approximately 20 hours preceding treatment but the pigs had free access to the alfalfa pasture and water during this time and throughout the treatment period.

The palatability of the mixtures was judged by observing the rate at which each lot of pigs consumed an amount of medicated feed equivalent to one-fourth of their daily ration.

Growth rate was used as a test of the toxicity of the compounds. Ten pigs from each lot were weighed on the day preceding treatment and again eight days later to determine whether or not any of the substances affected their rate of gain.

Egg count reduction and an estimation of the number of worms eliminated served as a measure of the effectiveness of the substances in removing ascarids. Ten pigs in each lot were selected at random and were considered as a representative sample of the lot. Feces were collected from the rectums of these ten pigs on the day prior to treatment. Egg per gram determinations made on these fecal samples were compared to counts made on feces from the same animals eight days following treatment. The Stoll-Lane flotation method

TABLE 2. Average Number of Ascaris Eggs Per Gram of Feces Before and After Treatment

Lot	Treatment	Before treat.*	Days After treat.* 8	21	47
1	Untreated controls	668	748	—	1258
2	Cadmium anthranilate	1044	66	20	103
3	Piperazine adipate	1400	0.6	—	1
4	Untreated controls	1022	2056	—	1467.2
5	Sodium fluoride	602	0.8	—	29.8
6	Parvex	852	5.6	—	52
7	Skim milk	600	604	—	2274.8

*Counts were made on the same ten pigs for the first post-treatment count and on a randomly selected ten pigs thereafter.

using saturated sodium nitrate was employed in the egg counting procedure.

The number of worms expelled was estimated by examining quart samples of freshly passed feces collected at intervals from each lot. The samples of fresh feces were collected at random from each lot at 24, 29, 34, 48, 57, 72, and 96-hour intervals following treatment. The feces in the quart samples were placed in tall jars and sprayed with water to break up the large pieces. After the larger particles and the worms had settled, the supernatant was decanted and the residue was examined against a black background to detect worms.

Weights of the animals were compared to determine whether the pigs receiving treatment had gained faster than the untreated controls. Each group of pigs was weighed when their

average ages reached 154 days. These were compared by accepted statistical methods to detect any significant weight differences between the lots.

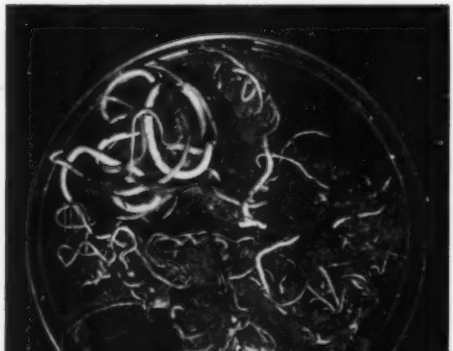


Fig. 2. Feces containing ascarids. These were selected from the lot receiving parvex 24 hours following treatment. The size of the worms can be compared to the dish which was 7½ inches in diameter.

Results

No differences were observed in the palatability of the medicated mixtures. Persons who have fed sodium fluoride to pigs frequently complain that the animals will not eat their medicated feed. We had previously observed this tendency also but in the trial reported here the pigs receiving the sodium fluoride mixture ate their medicated feed as rapidly as the pigs in the control lots. Each lot consumed one-fourth of their usual daily ration within one and one-half hours. There was no picking or excessive rooting at any of the troughs.

No ill effects were observed in any of the pigs receiving treatment. During the eight days following treatment all of the treated pigs ate their usual amounts of feed and gained an average of 1.7 lb. daily.

The only helminth eggs found in the fecal samples were those of *A. suum*. Parvex, piperazine adipate, and sodium fluoride each reduced the fecal egg count of the ten sample pigs 99% in eight days. Cadmium anthranilate was slower in affecting egg count, the average egg count of pigs in this lot was reduced by 98% within 21 days. However, ten pigs sampled from the animals which had received cadmium anthranilate were excreting an average of 103 eggs per gram (e.p.g.) of feces after 47 days had elapsed. Forty-seven days following medication the pigs which had been treated with piperazine adipate, sodium fluoride and parvex were excreting feces containing an average of 1, 29.8, and 52 eggs per gram respectively. The egg counts on the 47th day probably resulted from worms which were immature when the treatment was administered and which were not removed by it. Skim milk did not affect the egg count although 30 small ascarids were recovered from the fecal samples collected from this group. It might have been more effective if the animals had been deprived of alfalfa pasture. These results are given in table 2.

TABLE 3. Ascarids Recovered Per Quart of Freshly Excreted Feces from the Lots at Designated Intervals

Elapsed time hrs.	Untreated controls	Cadmium anthranilate	Piperazine adipate	Untreated controls	Sodium fluoride	Parvex	Skim milk
24	0	0	19	0	18	77	fragments
29	0	0	5	0	75	19	2
34	0	1	4	0	15	6	3
48	1	0	0	0	20	1	2
57	0	0	0	0	5	6	0
72	0	0	0	0	1	1	23
96	0	0	0	1	0	1	0
TOTAL	1	1*	28	1	134	111	30

*The directions on the container of the product state that worms may still be expelled after the 10th day, thus, worms were probably expelled after observations were terminated.

During the 96-hour period following worming, 134 worms were found in the seven samples of feces collected from the lot treated with sodium fluoride; 110 were found in the samples from the pigs treated with parvex; 28 were in samples picked up in the lot containing the pigs treated with piperazine adipate, but only one worm was found in the fecal samples collected from the lot treated with cadmium anthranilate. The manufacturer states, however, that cadmium anthranilate kills worms over a period of ten days, presenting the possibility that worms were expelled after the observations ceased. The greatest number of worms were found in the feces collected from the lots treated with parvex and piperazine adipate 24 hours after they were treated and in the lot fed sodium fluoride 29 hours after treatment.

Discussion

The piperazine products were equal to sodium fluoride in efficacy but cost more per treatment. Costs per 100-lb. pig were: Sodium fluoride four cents, cadmium anthranilate 19 cents, parvex 27 cents, and piperazine adipate 37 cents. These figures are based on prices quoted October 1, 1955. If piperazine adipate and parvex become more widely used their costs probably will decrease. The non-toxic nature of these compounds may justify their additional cost.

The treated pigs did not gain any faster than the untreated ones. At the age of 154 days the average weight of the pigs treated with sodium fluoride, piperazine adipate, cadmium anthranilate, and parvex was 155 lb. The average weights of the pigs in the two control lots and the skim milk lot was 159 lb. at this age. The four pounds difference between the groups was not statistically significant. Thus, no increase nor decrease in growth rate was obtained when ascarids were removed from swine in the trial reported here. This lack of effect need not necessarily be interpreted as indicating that ascarids do not harm swine. If these parasites had inflicted damage during earlier stages of the infection it may not have indicated itself in this study. At any rate, there was no immediate profit resulting from treating these pigs and the cost of treatment must be subtracted from the profit realized by the producer. The treatment did result in an almost complete elimination of eggs from the feces of treated animals. Reducing the number of eggs produced will protect pigs which inhabit these premises in the future. For example, the 42 pigs in the piperazine adipate lot were excreting an average of 1,400 eggs per gram of feces prior to treatment. Pigs this size excrete at least 1 kg. of feces daily, thus each pig was excreting almost 1.4 million eggs each day. Under these circumstances the 42 pigs were seeding their lot at a rate of nearly 9,800 eggs per square yard every day. Eight days following the treatment these same animals were spreading a calculated 4.2 eggs over each square yard of their pasture daily. It is obvious that baby pigs placed in lots formerly occupied by untreated pigs will be exposed to a much greater concentration of infective eggs than will pigs placed in lots previously used by pigs treated with sodium fluoride, piperazine adipate, and parvex. The cost of the present treatment may be offset by better growth of future litters because this treatment reduced the number of infective ascaris eggs available.

The prepatent period for *A. suum* is considered to be about 75 days and worming of pigs before they reach this age will prevent eggs being shed. They should be treated again before another 75 days have elapsed or newly acquired worms will begin contaminating the premises. Many producers routinely worm their pigs at two and four months of age in order to prevent contamination of their lots with ascaris eggs. Breeding stock should be wormed at two-month intervals. The piperazine compounds appear to be ideal drugs for treating breeding stock because of their apparently reduced toxicity.

Summary

A field evaluation of five ascaricidal substances was conducted on 399 pigs. Sodium fluoride, piperazine adipate and parvex each reduced the egg count 99% in eight days and costs per 100 lb. pig were four cents, 37 cents, and 27 cents respectively. Cadmium anthranilate reduced the egg count 98% within 21 days and cost 19 cents per pig. Only slight ascaricidal action could be attributed to skim milk. Application of ascaricides as a prophylactic measure is discussed.

REFERENCES

1. Spindler, L. A., and Zimmerman, H. E., Effect of Skim Milk on the Growth and Acquisition of Parasites by Pigs under Conditions of Constant Exposure to Infection. *Proc. Helminth. Soc. Wash.*, 11:49, 1944.

2. Haberman, R. T., Enzie, F. D., and Foster, A. O., Tests with Fluorides Especially Sodium Fluoride, as Anthelmintics for Swine. *Am. Jour. Vet. Res.*, 6:131, 1945.

3. Guthrie, J. E., Critical Tests with Cadmium Anthranilate as an Ascaricide in Swine. *Vet. Med.* 49:413, 1954.

4. Hewitt, R., Wallace, W., White, E., and Subba-Row, Y., The Treatment of Ascariasis in Dogs with 1-diethyl carbamyl-4-methyl Piperazine Hydrochloride. *Jour. Parasit.*, 34:237, 1948.

5. Fayard, C., Ascaridiose et Piperazine. *These. Paris. Abst. Sem. Hop. Paris*, 35:1778, 1949.

6. Mouriquand, G., Roman, E., and Coisnard, J., Essai de traitement de l'oxyurose par la piperazine. *Jour. de Med. de Lyon*, 32:189, 1951.

7. Hartley, F., Piperazine in the Treatment of Threadworms. *Brit. Med. Jour.*, 4860:521, 1954.

8. Sloan, J. E. N., Kingsbury, P. A., and Jolly, D. V., Preliminary Trials with Piperazine Adipate as a Veterinary Anthelmintic. *Jour. Pharm. & Pharmacol.*, 6:718, 1954.

9. Leiper, J. W. G., The Piperazine Compound V.19 for the Removal of Ascaris and Oesophagotomum from the Pig. *Vet. Rec.*, 66:596, 1954.

10. Gurd, M. R., Personal communication. In: *Vet. Rec.*, 66:596. Article by J. W. G. Leiper, 1954.

11. Cross, B. G., David, A., and Vallance, D. K., Piperazine Adipate: A new Anthelminitic Agent: Part II. Toxicological and Pharmacological Studies. *Jour. Pharm. and Pharmacol.*, 6:711, 1954.

Advances Made In Swine Practice

H. C. SMITH,* D.V.M., Sioux City, Iowa

Part V: Swine Influenza

Previous installments in this series of articles prepared by Dr. H. C. Smith have been concerned with: Part I. Hog Cholera; Part II. Swine Erysipelas; Part III. Porcine Leptospirosis; and Part IV. Swine Enteritis.

In each, Doctor Smith summarizes much information that has developed on each of these conditions which has brought into focus salient points that will assist practioners in diagnosis, understanding of specific disease processes, and prescribing a regimen for treatment.

In this, Part V. Swine Flu, there is pointed out that serious application to the problem and extensive research has answered the all-important question of the origin of infection and many of the complications and synergisms that must exist before classical disease symptoms are manifested in swine herds. No specific treatment agent is available, but a number of control procedures are suggested from facts learned by a number of investigators.

Research on influenza in man and swine may be expected to complement each other considering the relationship so far shown to exist. It is not too much to hope for useful chemotherapeutic agents for treatment and biological products for induction of immunity to be made available in the not-too-distant future.

IN the fall of 1918, an unusual disease of swine appeared in the hog producing states. It followed in the wake of an epidemic which had been given the name influenza.

Up to this time, the only known disease to affect an entire herd of swine was hog cholera. Few animals recovered from cholera. Many hogs that became affected with the new disease did recover and without treatment. Within a few days almost all individuals in a herd became sick. Body temperatures were high, all bunched together, lost their appetites, breathing was labored, thumping was common and weight loss rapid. Death rate, as a rule, did not exceed 4% of the entire drove. Dr. J. S. Koen, a field veterinary inspector for the U. S. Bureau of Animal Industry, named the new disease swine "flu" because of its resemblance to the human disease.

In 1919, the disease again appeared in herds throughout the hog belt.

Koen[1] described the disease as he observed it in the field. The same description given then would be similar to the condition as it appears today.

In 1920, the BAI[2] began a study of swine "flu".

Charles Murray's[3] investigations were undertaken with the view of determining what relationship, if any, the organisms variously reported as present in the organs of affected hogs had to the disease. In the fall of 1919, swine flu again appeared in many herds. He isolated a Gram-negative micrococcus with marked regularity from a number of swine suffering from bronchopneumonia, so called "flu".

Murray[4] did considerable work with this new disease. He reported on the isolation of a micrococcus which he thought might be the cause.

In 1921, Robert Jay[5] described a condition occurring in swine which manifested certain characteristic symptoms such as thumps, edema of the eye lids, intense lacrimation, edema of the nasal and bronchial mucous-membranes, with a profuse discharge of mucus, harsh cough, some diarrhea and high temperatures which extended over a period of two or three days. The term "flu" was applied to this condition.

Rob Spaulding Spray[6] referred to infectious pneumonia as being synonymous with hemorrhagic septicemia and flu. He isolated a streptococcus from pneumonic lungs. He found *B. suisepticus* in 4% of normal lungs, while in cases of pneumonia he found it in 54%. This finding served to clear up the significance of this organism as a pathogen in swine.

M. Dorset *et al.*[7] reported that the occurrence of diseases which affect the respiratory organs of swine had long been recognized. The visible symptoms which usually result from a pneumonia or pluerisy, or both, were seen frequently in cases of hog cholera, verminous pneumonia, and swine plague, or what some had seen fit to call hemorragic septicemia. Therefore, if veterinarians recognized swine flu as a distinct entity, they should differentiate

*Allied Laboratories, Sioux City, Ia.

between the several types of pneumonia. The symptoms of swine flu pointed exclusively to the upper respiratory organs. Cultures from the lungs of affected animals produced a growth of several organisms such as in *bronchisepticus, B. coli* and a nonhemolytic streptococcus.

E. A. Cahill[8] called attention to the fact that hogs suffered from diseases other than hog cholera. He reported on the bacteriological examination of tissues. He stated that examinations of specimens from any section of America would reveal *B. suisepticus* for a period of one or two months and, without any warning, there would be a complete change. This statement was true then and it is today. There will be periods when the bacteriological examination of tissues will be mostly Salmonella; then a few months later the cultures will produce *Hemophilus influenzae suis* and a pneumococcus for a month or two; then there will be a change to Erysipelothrix for another period, and so on until another cycle appears.

W. W. Dimock and D. J. Healy[9] described hog flu as bronchopneumonia.

In 1923[10] the editor of VETERINARY MEDICINE stated that all swine, regardless of age, were susceptibile although the disease was not of common occurrence in small pigs. Swine immune to cholera and those that had been immunized were equally susceptible. Swine that had gone through a siege of flu were again susceptible several months later.

A. H. Quin[11] was of the opinion that diet was an essential factor in the occurrence of this disease. He based his opinion on the fact that the disease was extremely rare as a specific condition in suckling pigs on a balanced ration of milk. Second, it was most common in pigs that were force-fed in an over-thrifty condition. The third reason for a dietary cause of this trouble was that the period of incubation, as a rule, was not always the same.

Influenza and Swine Flu

In 1927, C. N. McBryde[12] stated that the appearance of swine flu as coincidental with a severe outbreak of influenza in man which occurred over the country in the fall of 1918. The similarity in symptoms served to engraft the term "flu" on the new epizootic. The disease appeared to be seasonal, occurring in the fall of the year when weather was cold and damp, although this was not always true.

Between 1918 and 1927, the disease appeared regularly. By this time hog raisers were able to recognize the disease and rarely called for the services of the veterinarians; but they did purchase large quantities of "flu" medicine.

N. McBryde *et al.*[13] stated that there was no specific treatment for the disease. However, if the affected animals were given good care and attention; provided with good sleeping quarters free from drafts; good, dry bedding free from dust and were given a light diet, usually there was little loss and frequently the entire herd recovered. Drugs acting on the respiratory tract may be of value. Their work demonstrated conclusively that the causative organism of hog flu did not circulate in the blood stream. Inoculation experiments with trachael and bronchial mucus of sick hogs had demonstrated that the disease may be conveyed quite readily by dropping suspensions of these secretions in the nostrils of healthy animals. It was quite evident, therefore, that the infectious agent of hog flu was present in the tracheal and bronchial secretions. Filtered material did not reproduce the disease. A pleomorphic Gram-positive bacillus was recovered from the respiratory tract in over 50% of the cases of hog flu. At that time they did not realize that the flu virus in combination with *Hemophilus influenzae suis* would reproduce the disease.

J. S. Koen[14] described what he observed on postmortem examination of affected swine. Enlarged and congested cervical lymph glands were observed. Lobular pneumonia or some other type was always present. Deaths were due to pneumonia.

According to Koen[15], until the early fall of 1918, flu in swine had not been observed. At least no one had called attention to it. When the disease appeared, it looked like hog cholera and it was feared that the serum and virus method of immunization had failed to produce immunity. However, herds that were cholera immune and some that were not immune were involved. In affected droves, owners believed that all of them would die. About the time that pigs looked as though they would die, they would begin to show improvement and recover rapidly. Mortality was about 1 to 2%. Entire herds sickened suddenly and severely. There was thumping and a peculiar cough in all. All swine in a herd became affected within 24 to 48 hours. Guaiacol compounds were used as a treatment.

J. S. Fulton[16] stated that the disease was produced by cultures of the pleomorphic ba-

cillus suspected as the causative organism of swine flu. The organism readily lost its virulence after repeated transfers on artificial media or when kept a short time.

Bacteria-Virus Disease Etiology

R. E. Shope[17] reported that swine influenza was caused by the combined action of a filterable virus and the *Hemophilus influenzae suis* organism.

He also reported[18] that pigs given intramuscular injections of swine influenza virus developed a high neutralizing titer and were resistant to intranasal instillations after 33 days.

He also demonstrated[19] that, when swine influenza virus was injected intramuscularly into susceptible pigs, it would not reproduce typical flu, even though the *Hemophilus influenzae suis* organism could be found in the upper respiratory tract of pigs. Immunity developed as a result of inoculation.

W. Smith, *et al.*[20], reported that swine influenza virus caused a disease in ferrets which was indistiguishable from that produced by a virus of human origin. Swine and human viruses had close antigenic relationships. The ferret disease was not modified in character when cultures of *Hemophilus influenzae suis* were inoculated together with the virus.

T. Francis, Jr.[21], reported that, following an outbreak of human influenza in Puerto Rico, the virus could be passed to both ferrets and mice. It was possible to produce the infection in those animals with filtrates which were bacteriologically sterile.

C. H. Andrews, *et al.*[22] showed that the swine influenza infection in mice was like that in the ferret and unlike that in the pig; the virus alone produced a severe and perhaps fatal disease, no concommitant bacteria being necessary.

R. E. Shope[23] found that, upon bacteriological examination, the respiratory tracts of animals infected by contact were free of *H. influenzae suis*. He concluded that the virus alone transferred from sick to normal animals.

He also reported[24] that the ferret passage caused no apparent attenuation of the virus for swine. Two field strains of virus were different in their initial pathogenicity for mice[25]. One strain was pathogenic, while the other required two or three mouse passages to acquire full virulence. Bacteria played no significant role in the mouse disease, though essential in that of swine. Fatal pneumonia could be produced in mice by pure virus infections. In mice, the disease was not contagious. Prolonged virus serial passages in mice did not influence its infectivity or virulence for swine. It was stable so far as its infectivity was concerned and could be transferred at will from any one of its three known susceptible hosts to any other.

Marian L. Orcutt and Richard E. Shope[26] found that swine influenza virus could be reg-

ularly present in the turbinates, tracheal exudate, and lungs of infected swine but not in the spleen, liver, kidneys, mesenteric lymph nodes, colon mucosa, brain, or blood. The virus evidently had a strong affinity for the respiratory tract and exerted its specific effect in those organs.

Shope[27] found that swine influenza virus obtained from the lungs of infected ferrets or mice, when administered intramuscularly or subcutaneously, immunized swine to swine influenza. Repeated injections produced greater immunity than a single one. It appeared to make little or no difference whether the virus used as a vaccine was obtained from the lungs of infected mice, ferrets, or swine.

He concluded[28] from the known history and similarity of these viruses to that obtained from man that it appeared likely that the virus of swine influenza was the surviving prototype of the agent primarily responsible for the great human pandemic of 1918, as suggested by Laidlaw. The presence in human sera of antibodies neutralizing swine influenza virus was believed to indicate a previous immunizing exposure to or infection with an influenza virus of the 1918 type.

Shope[29] stated that swine inoculated intranasally with the virus of human influenza developed an ill-defined, mild, and usually afebrile illness of short duration. Swine inoculated intranasally with the virus of human influenza and a small amount of a culture of *H. influenzae suis* developed a febrile, prostrating illness similar to swine influenza. Swine recovered from infection with the virus of human influenza were resistant. The sera of such animals did not neutralize the virus of swine influenza.

Thomas Francis, Jr.[30], found that the serum of experimental animals convalescent from infection with the virus of human or swine influenza contained antibodies which conferred complete passive protection on mice against the homologous virus.

Later investigation by Shope[31] revealed that *H. influenzae suis* given intramuscularly to swine elicited an immune response capable of modifying the course of a later swine influenza infection. A partial immunity to the bacterial component of the etiologic complex could be established.

Shope[32] stated that swine recovered from infection with swine influenza or swine influenza virus alone were usually immune to infection with a mixture of human influenza virus and *H. influenzae suis*. Swine recovered from human influenza virus alone were not immune to swine influenza.

Joseph P. Scott[33] reported on his work at the 13th International Veterinary Congress at which time he stated that swine influenza was readily transmitted by intranasal instillation of filtered or glycerinated virus mixed with cultures of *Hemophilus influenzae suis*. The disease was transmitted to susceptible pigs by contact. Immunization by intranasal or intramuscular injection of swine influenza virus caused the production of neutralizing substances and protected many pigs against infective instillation 40 to 60 days later. A few pigs were not immunized.

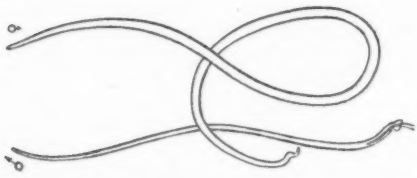
Scott[34] expressed the opinion that the field strain of swine flu was not pathogenic for mice without mouse passage. The virus usually became pathogenic for the laboratory animals after four or more mouse passages. "Mouse fixed" strains were virulent for swine. To prove the identity of swine flu virus, one could use swine influenza antiserum and virus added together and then instill the mixture into mice. This is what is commonly known as a virus neutralization test.

Thomas Francis, Jr., and T. P. Magill[35] reported that two strains of epidemic influenza virus which had appeared to be identical immunologically could be differentiated serologically. Two methods were used; (1) Cross neutralization tests using the various strains of virus and sera prepared against these strains by the intraperitoneal vaccination of rabbits, and (2) cross-active immunity tests in mice immunized by the intraperitoneal inoculation of virus. By these procedures, it was possible to show that distinct differences in strains of epidemic influenza virus occurred.

Role of Lungworms

Richard E. Shope[36] found that lungworm larvae from pigs with swine influenza harbored swine influenza virus throughout their development, both in their intermediate host, the earthworm, and in their definitive host, the swine. The virus apparently laid latent within the lungworm after the parasite had finally migrated to the swine respiratory tract and was only liberated or activated to cause infection when a provocative stimulus was applied. This explained how and where the virus persisted during the interval of approximately eight or nine months and between the conclusion and beginning of epizootics of the disease. The coinfecting agent, *H. influenzae*

suis, might persist in the upper respiratory tract of recovered swine, but this was not the case with the virus. These findings have been of great help to practitioners.



Metastrongylus elongatus (common lung worm of swine), after Neven-Lemaire. As indicated male and female, three times natural size.

Shope further showed that the lungworm of swine might be instrumental in the spread of swine influenza. The intermediate host for the lungworm was the earthworm; (1) the red-striped which are found in manure piles and fecal contaminated soil, and (2) the common garden variety. The earthworm feeding on fecal contaminated ground might swallow the lungworm eggs which had hatched in the earthworm's intestines. The tiny lungworm larvae bore into the glandular portion of the intestines and hearts of the earthworm. In about a month they complete their development and are capable of producing an infection in a pig that has eaten the earthworm. Once inside the pig, the lungworm larvae are freed from the earthworm by digestion where they migrate to the blood and lymphatic systems and localize in the lungs and develop.

Virus Studies

John R. Mote and Leroy D. Fothergill[37] found that the inability of human strains of *H. influenzae* to establish themselves in the respiratory tract of swine suggested a possible biologic difference between human and swine strains.

Richard E. Shope[38] described the transmission of swine influenza virus by way of the swine lungworm. It was found that the virus was present in marked noninfective form in the lungworm and that, in order for the virus to be rendered infective, a provocative stress had to be applied to the swine harboring it.

Joseph P. Scott[39] used virus from the affected lung tissue of a pig destroyed after showing acute symptoms of swine influenza for three to five days. Twelve cc. of a 15% suspension of the ground lung in sterile nutrient broth with 3 cc. of a blood culture of *H. influenzae* was used as the inoculum which was instilled into the nose. The inoculated pigs developed high temperatures, 105 to 106 F., in 48 hours and exhibited the characteristic symptoms associated with flu. In this was demonstrated that swine influenza virus obtained from swine lung tissue was, in all cases, of little or no value as an immunizing agent. A hyperimmune swine influenza serum was produced by three to six subcutaneous injections of egg passage swine influenza virus. Pigs injected with 100 cc. of the hyperimmune serum before exposure to the virus required nine days to develop symptoms while control pigs required only two days. The serum had no effect on the course of swine influenza when administered after the development of symptoms.

George K. Hirst[40] demonstrated that influenza virus could be absorbed onto avian red cells. Later the virus was released from the red cells. The release of virus was accompanied by inactivation or destruction of the red cell receptor substance, as illustrated by the fact that the cells became incapable of adsorbing further virus. The virus was propagated on allantoic membrane of ten-day-old embryos. It was originally a swine influenza virus carried through mice. The agglutination titer of infected allantoic fluid procured in a standard way was relatively constant, regardless of the influenza strain used and its pathogenicity for mice. The chicken red cells used for all tests were a 2% suspension and were used as the standard. The virus and cells were added together, then the sera to be tested and the test shaken. After one hour the test was read against a bright white background. The amount of red cell sedimentation, rather than visible agglutination, was taken as an index of the degree of reaction because it was easier to see. It was the density of the cells remaining in suspension that was used for reading the tests. When agglutination occurred, the margins of the bottom disk had a lacy pattern made up of clumps of cells.

C. N. Dale[41] published an excellent article on swine influenza in the Year Book of Agriculture. He called attention to the possibility of hemorrhagic septicemia being associated with hog cholera and swine influenza.

T. C. Jones and Fred D. Maurer[42] found that serums from horse convalescent from equine influenza had no significant increase in neutralizing capacity against swine influenza virus.

Richard E. Shope[43] presented additional information on the role played by the lung-

worm in transmitting swine influenza virus. This evidence indicated that the swine influenza virus represented a surviving prototype of the 1918 pandemic human influenza virus. The agent was fortunate enough to find awaiting it an intermediate host in the swine lungworm, capable of perpetuating it so effectively. Had no such effective reservoir host been available, swine influenza could scarcely have appeared after its first epizootic year of 1918. There was, however, the possibility that other reservoirs might be found.

Combined Etiological Agents

Frederik B. Bang[44] stated that swine influenza was caused by two agents, a bacterium (*H. influenzae suis*) and the virus of swine influenza, acting together to produce an extensive pneumonia. This synergistic action could be reproduced by inoculating the two agents on the chorioallantoic membrane of nine-to ten-day chick embryos. This rapidly killed a large proportion of the embryos and caused destruction of the lung tissue in the chicks that survived. This effect was not produced by the action of either virus or bacterium alone. The bacteria was not cultured from the lungs or heart blood of the embryos. Since *H. influenzae suis* persisted on the chorioallantoic membrane of the embryos infected with swine influenza virus longer than on normal embryos, the bacterium apparently benefited by the presence of the virus. The addition of live or killed bacteria or of bacterial extracts greatly increased the mortality of embryos infected with swine influenza virus.

George K. Hirst[45] attempted to formulate a tentative hypothesis as to the possible mechanism of the early stages of influenza virus infection of the respiratory cell. He stated that it might not be sufficient merely for an inhaled virus particle to come in contact with any point on a susceptible cell, and it might be necessary for it to become attached to a specific receptor substance to gain entrance. Before the virus could infect, it might also have to alter or destroy this receptor substance by means of an enzyme in order to pave the way for penetration and parasitism of that cell. Once the receptor substance was destroyed, the virus became more firmly bound, parasitized the cell, multiplied and again appeared free in the lung, making possible spread of the infection uninterrupted.

William F. Friedwald[46] found that the influenza virus suspensions exhibited two distinct properties *in vitro* which could be detected readily. The capacity of the virus suspensions to agglutinate red cells appeared to be closely associated, if not identical, with the infective activity of the virus. The complement-fixing antigen had been found to be considerably smaller than the infective particle and separable from it. It resembled soluble antigens of other viruses. The antigen and not the virus particle was responsible for the complement-fixation reaction.

A. R. Taylor, *et al.*[47] described the isolation of a particulate component from the chorioallantoic fluid of chick embryos infected with the virus of swine influenza. Examination by the electron microscope showed that the particles appeared to be rounded or ovoid and of variable size. Chemically the particles were a complex of lipid and non-lipid carbohydrate and protein containing, on the basis of non-lipid phosphorus content, about 4.8% nucleic acid.

Vaccine Preparation and Use

A. R. Taylor, *et al.*[48] reported on an apparatus and procedures necessary for the culture, harvest and concentration of the influenza virus, for the purpose of preparing vaccines. The yield of virus could be controlled and kept at a level of about 90% or more of the virus initially present in the chorioallantoic fluid.

I. W. McLean, *et al.*[49] stated that the significance of the results of their studies on dose response in swine was of chief interest in the possible bearings of the findings on the problem of vaccination of man for protection against influenza. The dose of swine virus vaccine was the same as the human types of vaccine, it being the amount that could be obtained from a single egg and concentrated to 1 cc. The experiments with swine showed that, irrespective of the dose, a single vaccination was relatively ineffective and inefficient in the induction of antibodies in comparison with the effects of repeated vaccinations. Multiple vaccinations might be expected to be of far greater importance than the size of dose given at any one time. As a result of this work, they concluded that repeated vaccinations provided a far greater promise of maintaining a high antibody level through the influenza season. Future work will be necessary in order to determine if this assumption was correct.

Loring Whitman[50] stated that many suitable tests were being studied in an effort to obtain a simple yet effective method of influenza determination. This report concerned a

study of the variables involved in the performance of the agglutination-inhibition test.

Herold R. Cox, *et al.*[51] reported that methanol was a far superior product in the concentration of influenza virus, because it produced no virus denaturation nor loss of activity. The method was particularly valuable from the standpoint of producing vaccines on a large scale.

I. W. McLean, *et al.*[52] prepared a vaccine made from the chick embryo adapted strain of swine influenza virus. It was purified virus inactivated by formalin. The challenge virus was the chorioallantoic fluid from virus infected chick embryos. The challenge virus was given intranasally by means of a hand atomizer. The pig's mouth was held shut and the nose sprayed during inspiration. The results of the experiment revealed that the administration of the challenge dose of active virus induced a disease of considerably severity in the untreated control animals. The symtoms observed were cough, rapid abdominal respiration and varying degrees of prostration. The animals manifested high temperatures, loss of weight and a decrease in the amount of food usually consumed.

The vaccinated pigs, after exposure, exhibited little evidence of disease except weight loss and appetite which indicated a mild form of the disease. There was a definite indication that vaccination protected in varying degrees against the dose of virus in some of the animals tested. In general, there was a milder type of illness in the vaccinated animals than in the controls.

When more than one dose of vaccine was given, it was not possible to demonstrate significant differences between the effects of one, two, or three vaccinations on the immune response. In every instance, exposures of the vaccinated animal to active virus resulted in a considerable increase in antibody titer, indicating probable asymptomatic infection with the virus.

The results of these tests on swine provided a means of evaluating with considerable accuracy the efficacy of formalin—inactivated swine influenza virus administered subcutaneously—on the state of resistance to infection with the active virus. While the vaccine decreased the clinical manifestations of the disease in swine previously without contact with the virus, it appeared clear from the antibody studies that it did not possess the capacity to confer complete immunity to invasion by the active flu virus. As a result of this information, it would appear that vaccination of swine for influenza would be far from being practical for the veterinarian and the swine producer. This paper covered a great amount of research and should be read by every practicing veterinarian.

Extrinsic Factors

Richard E. Shope[53] reproduced swine influenza by feeding to pigs earthworms that contained lungworm larvae. The earthworm, from two to 12 months earlier, had been fed embryonated lungworm ova from pigs infected with swine influenza virus. Thirty days after the pigs had consumed the earthworms, they were exposed to "raw" weather either in the form of snow or rain. Control animals not fed earthworms also were exposed to adverse weather conditions. The controls did not sicken as a result of the weather exposure, and their blood was free of swine influenza virus neutralizing antibodies. Of the ten pigs that were fed the earthworms and exposed to the weather, four of them became ill. The remaining six did not become ill but later their sera contained influenza virus neutralizing antibodies.

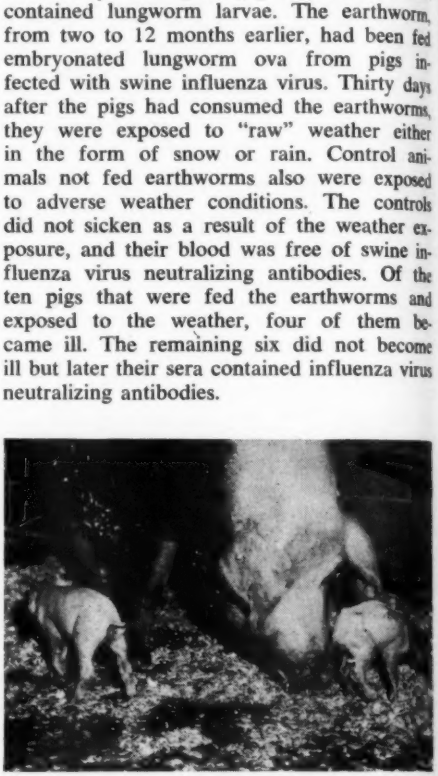


Photo Courtesy Dr. George A. Young, Jr.

No profit here. Shown above is what remains of a litter of 15. The pigs were normal at birth; weight averaged 2.6 pounds. Most of them died within three or four days; the two still alive two weeks after birth were emaciated and weak. The one on the right died soon after the picture was taken; the other died in a few days.

It is Shope's opinion that swine become infected with swine influenza virus through the ingestion of earthworms rooted out of the pastures during the late summer and early fall. By the time fall weather comes, the lung worms containing the flu virus are in the hogs' lungs and the "hog flu weather" is the trigger mechanism that sets up the influenza

epizootic. He has proved this theory in the laboratory.

This review indicates that there is a possibility that swine flu may be a variant of the original human influenza epidemic that occurred in 1918.

Summary

The work of Richard E. Shope on swine influenza has been outstanding and deserves great credit. Although Shope is a physician, he has done much of his experimental work in the field of veterinary medicine; consequently, he is equally well recognized in both fields of research. It is interesting to note that Doctor Shope had a theory years ago that the flu virus must have a reservoir somewhere in some of the lower forms of animal life. His theory was based upon the observations that epizootics of swine influenza have occurred periodically, yet the life span of a pig is relatively short. Therefore, he believed that the reservoir must be outside the body of a pig, but it had to be something that the pig would contact. His theory has been proved by his recent publication[58].

Every veterinarian and swine producer owes Richard E. Shope a vote of thanks for an idea, a theory and proof of both and for his work with swine influenza.

At the time flu made its appearance in swine herds, it was feared that hog cholera immunization had failed. At that time, few diseases of swine (as a herd condition) were recognized, other than hog cholera. The writer found, upon reviewing veterinary literature, that veterinarians attending association meetings at that time were not convinced that swine flu was a new disease entity. Hog cholera was the only recognized herd disease of swine. It was several years later before all of them were convinced that swine might have other diseases.

Progress has been made in the diagnostic field, but actually little progress has been made in the treatment of flu. Guaiacol compounds were used in the early days and are still being used today. Ammonium chloride was, and still is, an old standby for some veterinarians. As soon as the sulfonamides were developed, they were used to a great extent. More recently most of the presently known antibiotics have been used with results which do not indicate that any of them is specific for the virus of swine influenza.

The veterinary profession should not be criticized for failure to control swine flu. Human influenza most probably is being treated in the same manner as is swine flu.

If one should be so bold as to make a prediction concerning the future prevention of swine influenza, one would have to consider the progress that has been made in the discovery that the common earthworm contains the swine lungworm and it, in turn, contains the flu virus. The destruction of the common earthworm by chemical means might be part of the solution in preventing the disease. Many types of chemicals are being applied to our farm lands in attempts to increase production. Some of them may destroy the common earthworm.

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REFERENCES

1. Koen, J. S., A Practical Method for Field Diagnosis of Swine Diseases. *Am. Jour. Vet. Med.*, 14:468, 1919.
2. Report of the Chief of the BAI, 1919.
3. Murray, Charles, Notes on a Micrococcus Isolated from Cases of Broncho-Pneumonia (So-Called Flu) of Swine. *Jour. Ar. Vet. Med. Assn.*, 57:539 (Aug.), 1920.
4. Murray, Charles, Swine Flu. *Wallace Farmer*, Feb. 25, 1921.
5. Jay, Robert, Swine Plague "Flu" or Anaphlaxis. *Vet. Med.*, 16:30 (July), 1921.
6. Spray, Rob Spaulding, The Bacteria in Normal and Diseased Lungs of Swine. *Jour. Inf. Dis.*, 31:10 (July), 1922.
7. Dorset, M., McBryde, C. N., and Niles, W. B., Remarks on "Hog Flu." *Jour. Am. Vet. Med. Assn.*, 62:163 (Nov.), 1922.
8. Cahill, E. A., Hog Flu. *Jour. Am. Vet. Med. Assn.*, 62:168 (Nov.), 1922.
9. Dimoch, W. W., and Healy, D. J., Influenza of Swine, Hog Flu, Broncho-Pneumonia. *N. Am. Vet.*, 3:138, 1922.
10. Editorial, Swine Flu. *Vet. Med.*, 18:314 (Apr.), 1923.
11. Quin, A. H., Remarks on Hog Flu. *Jour. Am. Vet. Med. Assn.*, 62:169 (Nov.), 1922.
12. McBryde, C. N., Some Observations on "Hog Flu" and Its Seasonal Prevalence in Iowa. *Jour. Am. Vet. Med., Assn.*, 71:368 (June), 1927.
13. McBryde, C. N., Niles, W. B., and Mashey, H. E., Investigations on the Transmission and Etiology of Hog Flu. *Jour. Am. Vet. Med. Assn.*, 73:331 (July), 1928.
14. Koen, J. S., Swine Flu. *Vet. Med.*, 28:457 (Oct.), 1928.
15. *Ibid.*
16. Fulton, J. S., Hog Influenza. *Jour. Am. Vet. Med. Assn.*, 77:368 (Sept.), 1930.
17. Shope, Richard E., The Etiology of Swine Influenza. *Science*, 73:214, 1931.
18. Shope, Richard E., Swine Influenza: Experimental Transmissions and Pathology. *Jour. Exp. Med.*, 54:349, 1931.
19. Shope, R. E., Studies on Immunity to Swine Influenza. *Jour. Exp. Med.*, 56:575, 1932.
20. Smith, W., Andrews, C. H., and Laidlaw, P. P., A Virus Obtained from Influenza Patients. *Lancet* (London), 11:66, 1933.
21. Francis, T., Jr., Transmission of Influenza by a Filterable Virus. *Science*, 80:457, 1934.

22. Andrews, C. H., Laidlaw, P. P., and Smith, W., The Susceptibility of Mice to the Viruses of Human and Swine Influenza. *Lancet*, 11:859, 1934.

23. Shope, R. E., A Change in the Contagious Character of a Strain of Swine Inflenza. *Jour. Bact.*, 27:82, 1934.

24. Shope, R. E., The Infection of Ferrets with Swine Influenza Virus. *Jour. Exp. Med.*, 60:49, 1934.

25. Shope, R. E., The Infection of Mice with Swine Influenza Virus. *Jour. Exp. Med.*, 62:561, 1935.

26. Orcutt, Marian L., and Shope, Richard E., The Distribution of Swine Influenza Virus in Swine. *Jour. Exp. Med.*, 62:823, 1935.

27. Shope, R. E., Immunization Experiments with Swine Influenza Virus. *Jour. Inf. Dis.*, 64:47 (July), 1936.

28. Shope, Richard E., The Incidence of Neutralizing Antibodies for Swine Influenza Virus in the Sera of Human Beings of Different Ages. *Jour. Exp. Med.*, 63:669, 1936.

29. Shope, Richard E., The Susceptibility of Swine to the Virus of Human Influenza. *Jour. Bact.*, 34:31, 1936.

30. Francis, Thomas, Jr., The Immunological Relationship Between the Viruses of Human and Swine Influenza. *Jour. Bact.*, 31:37 (Jan.), 1936.

31. Shope, Richard E., The Effect of Hemophilus Influenza Suis Vaccines of Swine Influenzae. *Jour. Exp. Med.*, 66:169, 1937.

32. Shope, Richard E., Immunological Relationship Between the Swine and Human Influenza Viruses of Swine. *Jour. Exp. Med.*, 66:151 (Nov.), 1937.

33. Scott, Joseph P., Swine Influenza. 13th International Veterinary Congress. Zurich-Interlaken, 1938, p. 21-32.

34. Scott, Joseph P., Swine Influenza. Isolation and Identification of the Virus, Univ. of Pa. Bul., Feb. 1938.

35. Francis, Thomas, Jr., and Magill, T. P., Antigenic Differences in Strains of Epidemic Influenza Virus. *Jour. Bact.*, 36:284 (Sept.), 1938.

36. Shope, R. E., Intermediate Host Found for Swine Influenza Virus. *Science*, 85:441 (May 12), 1939.

37. Mote, John R., and Fothergill, LeRoy D., The Effect of Human Strains of Hemophilus Influenzae on Influenza Virus Infections of Swine. *Jour. Bact.*, 40:505 (Oct.), 1940.

38. Shope, R. E., Swine Flu. *Jour. Exp. Med.*, 74:49, 1941.

39. Scott, Joseph P., Studies on Swine Influenza Virus. Univ. of Pa. Bul., June 1941.

40. Hirst, George K., The Quantitative Determination of Influenza Virus and Antibodies by Means of Red Cell Agglutination. *Jour. Exp. Med.*, 75:49 (Jan.), 1942.

41. Dale, C. N., Swine Influenza. Keeping Livestock Healthy. 1942 Year Book of Agriculture, p. 703-713.

42. Jones, T. C., and Maurer, Fred D., Neutralization Studies of the Viruses of Influenza A, Influenza B, and Swine Influenza with Equine Influenza Convalescent Serums. *Am. Jour. Vet. Res.*, 7:179 (Apr.), 1942.

43. Shope, Richard E., The Swine Lungworm as a Reservoir and Intermediate Host for Swine Influenza Virus. III. Factors Influencing Transmission of the Virus and the Provocation of Influenza. *Jour. Exp. Med.*, 77:111 (Feb.), 1943.

44. Bang, Frederick B., Synergistic Action of *Hemophilus Influenzae Suis* and the Swine Influenza Virus on the Chick Embyro. *Jour. Exp. Med.*, 78.9 (July), 1943.

45. Hirst, George K. Adsorption of Influenza Virus in Cells of the Respiratory Tract. *Jour. Exp. Med.*, 78:99 (Aug.), 1943.

46. Friedewald, William F., The Immunological Response of Influenza Virus Infection as Measured by the Complement Fixation Test. *Jour. Exp. Med.*, 78:347 (Nov.), 1943.

47. Taylor, A. R., *et al.*, Purification and Character of the Swine Influenza Virus. *Jour. Immunol.*, 48:361 (June), 1944.

48. *Idem.*, Concentration and Purification of Influenza Virus for the Preparation of Vaccines. *Jour. Immunol.*, 50:291 (May), 1945.

49. McLean, I. W., *et al.*, The Relation of Antibody Response in Swine to Dose of Swine Influenza Virus Inactivated with Formalin and with Ultraviolet Light. *Jour. Immunol.*, 51:65 (Aug.), 1945.

50. Whitman Loring, Factors Influencing the Red Cell Agglutination Inhibitive Reaction in Influenza and Their Application to the Diagnostic Test. *Jour. Immunol.*, 56:167 (June), 1947.

51. Cox, Herold R., *et al.*, The Purification and Concentration of Influenza Virus by Means of Alcohol Precipitation. *Jour. Immunol.*, 56:149 (June), 1947.

52. McLean, I. W., *et al.*, Studies on the Immunization of Swine Against Infection with Swine Influenza Virus. *Jour. Immunol.*, 56:109 (June), 1947.

53. Shope, Richard E., The Swine Lungworm as a Reservoir and Intermediate Host for Swine Influenza Virus. Provocation of Swine Influenza by Exposure of Prepared Swine to Adverse Weather. *Jour. Exp. Med.*, 102:567 (Nov.), 1955.

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Soil Bank Plan Not New

In an Associated Newspaper release, under by-line of Raymond Moley, it is pointed out that if the national economy is producing too much food to meet the demand or need, lower prices will force reduction of production. This is another way to state the supply and demand law. What has been happening on the agricultural scene is inept political maninulation for 20 years to alter this basic law. Subsidies can not be expected to bring supply and demand into balance, but are almost certain to do the opposite, with resulting increases in surpluses.

Whereas economists warned the world that food technology was not keeping pace with world population growth some years ago, we now observe experts of the USDA shifting their position and to the belief that our population growth will not catch up with our food supply for many years to come.

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Piperazine drugs are relatively nontoxic for all domestic animals. They depress the parasite so that it passes out with feces and dies. Ova develop into infective larvae under favorable conditions, suggesting necessary sanitary practices to clean up the floor where worms are expelled.—*H. Meyer Jones. D.V.M.*

Studies On Micrococcal Mastitis In An Individual Herd†

M. J. DEUBLER, V.M.D., M.S., Ph.D., and E. J. COLE, M.S.,
Philadelphia, Pennsylvania

IT always has been possible to isolate many forms of micrococci from the mammary gland. Schalm and Woods[1] report that micrococci were found in more than 50% of the quarters in herds tested under their supervision. Hodges[2] reports that mastitis due to micrococci is less than 17%. The pathogenicity of these organisms presents an important problem if eradication is to be achieved. Numerous investigations have been concerned with studies of hemolysis, coagulation of plasma, and pigment production to separate pathogenic from non-pathogenic micrococci.

It is the purpose of this study to develop and evaluate laboratory methods useful in determining the pathogenicity of micrococci isolated from the mammary gland. Animals used in this study were from an average producing Ayrshire herd. Management and sanitation were considered ideal. A careful check was kept on the cleaning of the milking equipment. Duplicate rubber milking equipment was rotated every two weeks and worn parts replaced as needed.

Materials and Methods

Milk. Milk used in these studies was obtained from a herd of 45 cows shown to have micrococci in their udders but no long chain streptococci or Pseudomonas. Quarter milk samples were collected at monthy intervals for 12 months and cultured.

Milk Cultures. After milk samples were incubated for 12-14 hours at 37 C., 0.01 ml. of mixed milk was streaked on one-fourth of a bovine blood agar plate. Blood from a young steer was used in the preparation of the blood agar plates. This blood was tested against a stock culture of micrococci to insure a 5 mm. zone of beta hemolysis. The blood was citrated and mixed at a ratio of 1:10 with blood agar base (Difco and B.BL.).

After incubation for 24 hours at 37 C., plates were kept at 6-10 C. for an additional 24 hours and then streaked plates were read and toxigenic colonies were picked for further tests. All colonies showing a zone of clearing were classified as hemolytic micrococci. No separation was made of organisms producing either *alpha* or *beta* toxin.

Coagulase Test. The presence of coagulase was detected by the slide method reported by Cadness-Graves, Williams, Harper, and Miles[3]. This test was accomplished by preparing a homogeneous aqueous suspension of a suspected colony on a slide with a minimum of spreading, and mixing it with an equal sized drop of dehydrated bacto-coagulase plasma (Difco). The presence of coagulase was denoted by macroscopic clumping within five to 15 seconds. The micrococci from four different culturings were tested for coagulase activity. Results were reported as positive or negative coagulase activity.

Phosphatase Test. The reagent used in this test was phenolphthalein phosphate, introduced in 1942 by Bray and King[4] (for the purpose of demonstrating phosphatase in bacteria). The test was performed by preparing a heavy suspension of organisms (approximately 10^{10} bacteria) in 0.5 ml. of phenolphthalein phosphate. The suspension was incubated four hours at 37 C., then four drops of BQC* indicator were added to each tube. These tubes were agitated and allowed to stand at room temperature for 15 minutes. Three-tenths ml. of n-butanol was then added, the tubes were agitated again and then permitted to stand for an additional five minutes. The appearance of a blue or purple color in the butanol layer was interpreted as a positive test. The tests were conducted on all the micrococci from four different culturings.

Bacterial Agglutination. Specific antisera was prepared by intravenous inoculation of

†Partial support for this work was received from: Sharp & Dohme, Division of Merck & Co., Philadelphia, Pa., Wyeth Laboratories, Division of American Home Products Corp., Philadelphia, Pa., The Upjohn Company, Kalamazoo, Mich.

*BQC — 50 mg. of 2, 6 dibromo-N-chloro-p-quinone imine in 10 ml. of absolute methyl alcohol.

rabbits at three-day intervals for 12 days with three different types of micrococci. The antigens used were triple washed agar cultures, 36 hours old of: (1) *Micrococcus pyogenes* v. *aureus* producing *alpha* and *beta* toxins; (2) *Micrococcus pyogenes* v. *aureus* producing only *alpha* toxins, (3) *Micrococcus pyogenes* v. *albus* not producing toxins, isolated from acute cases of mastitis, and (4) control physiological saline. The antisera diluted 1:10 and 0.5 ml. was mixed with 1.0 ml. of a 0.85% saline suspension (approximately 10^9 organisms) of bacteria. Tubes were incubated for 24 hours and examined for macroscopic agglutination. The organisms isolated from four separate culturings were tested with the antisera.

Animal Inoculations. Two-month-old Swiss Albino mice were inoculated with 0.1 ml. of a 24-hour-old broth culture prepared from the following organisms: (1) Five hemolytic micrococci producing coagulase and phosphatase, (2) five non-hemolytic micrococci producing coagulase and phosphatase, (3) five non-hemolytic micrococci which produced neither coagulase nor phosphatase. Results were recorded by survival time.

Effect of Various Agents and Conditions on Characteristics of Micrococci. Three cultures of each of the following organisms were used: (1) Hemolytic micrococci, producing coagulase and phosphatase; (2) non-hemolytic micrococci, producing coagulase and phosphatase; (3) non-hemolytic micrococci not producing coagulase or phosphatase. These organisms were subjected to the following conditions in an attempt to change some of their basic characteristics: (1) Three passages through mice, intraperitoneally, (2) -10 C. for 24 hours, (3) sunlight for 12 hours, (4) 50 C. for four hours. Results were interpreted by comparison with the original untreated organisms.

Antibiotic Tratment. One mastitis ointment** was used exclusively in the herd during the test period. Each tube (3.75 gm.) contained penicillin (100,000 units), dihydrostreptomycin (50 mg.), and bacitracin (5,000 units) in a special base. On four successive months all quarters showing hemolytic micrococci that were sensitive to this combination *in vitro* and all clinical cases were treated with one tube of antibiotic ointment. Results of this treatment were judged by the presence or absence of hemolytic organisms on repeated culturings and incidence of clinical cases of mastitis.

**Tribiotic®, Wyeth Laboratories, Phil., Pa.

Results

In this herd 126 out of 180 quarters (70%) were shedding micrococci at some time during the 12-month test period. Hemolytic organisms were isolated monthly from seven to 18 quarters, or an average of 12 quarters. The remaining organisms isolated were non-hemolytic.

Coagulase and phosphatase tests were conducted with the organisms isolated on four separate cultures. Seventy-five percent of 72 hemolytic organisms were coagulase positive. The phosphatase showed 35 positive reactions with the 54 coagulase positive organisms. Of the 406 non-hemolytic organisms tested 26 were coagulase positive and 18 of the 26 were phosphatase positive.

One hundred forty isolations were typed with the prepared antisera. There was no specific agglutination between the three antisera and the micrococci isolated from the herd. It was impossible to separate micrococci producing coagulase and hemolysin and those producing no toxin by our serologic methods.

None of the 15 isolates of three different types of micrococci from the mammary gland showed pathogenicity for mice. No observable effects on hemolysis and coagulase and phosphatase activities of the micrococci studied were produced by: (1) Temperature of 10 C. for 24 hours, (2) sunlight for 12 hours, (3) temperature of 50 C. for four hours, (4) three passages through mice.

Treatment of the normal quarters shedding hemolytic micrococci with tribiotic® did reduce the hemolytic organisms for a short time, but the total number of quarters in the herd shedding hemolytic micrococci did not change. On the following monthly examinations, 44 of the 65 quarters treated were negative for hemolytic micrococci but in 54 of the quarters the hemolytic micrococci were present on later tests. During the four treatment periods the total number of quarters shedding hemolytic organisms in the herd remained about 12 quarters.

The incidence of clinical cases of mastitis in this herd of 45 cows was 2-6 quarters per month during the year. The treatment of the clinical cases produced good response to the mastitis ointment, but recurring attacks were common.

In eight of 12 acute cases of mastitis the organisms isolated at the time of the attack were non-hemolytic, coagulase negative mi-

crococci; the other four cases were negative on culture. Cultures of quarters having had clinical mastitis, but taken before and after the attack, hemolytic micrococci were isolated from 17 of 48 quarters; 28 of the organisms isolated were non-hemolytic and the other quarters were negative on culture.

Discussion

The laboratory methods used and results obtained have been described in an attempt to determine the pathogenicity of micrococci isolated from the mammary gland. The herd of cattle studied is typical of many herds in which over half the quarters are shedding micrococci.

We believe hemolysis and coagulase activity are the simplest routine tests for the classification of micrococci. Our studies indicate that the relation of these properties to pathogenicity is questionable. Organisms isolated in the majority of the clinical cases in this herd showed neither hemolysis nor coagulase activity. Treatment of the quarters shedding hemolytic organisms, which included the coagulase positive organisms, did not change the total incidence of mastitis.

The agglutination test and animal inoculation did not yield additional information concerning the pathogenicity of the micrococci found in the mammary gland. Hemolysis, coagulase activity, and phosphatase production of the mammary micrococci studied did not appear to be changed by environmental conditions and treatment.

It is felt that antibiotic therapy in micrococcal mastitis based on the pathogenicity tests available at the present time may not produce the expected reduced incidence of mastitis.

Summary

1. Our studies in an individual herd, using these methods to aid the determination of pathogenic micrococci, are described.

2. These methods indicate that they are of little value in predicting the incidence of clinical mastitis. Treatment of quarters shedding micrococci did not reduce the herd incidence of mastitis.

Conclusions

We have not been able to develop a method of determining whether or not micrococci shed by clinically normal quarters will produce clinical mastitis. In a herd under good management, our study indicated that attempts to eradicate all the so-called pathogenic micrococci did not reduce the number of quarters shedding micrococci or the incidence of clinical mastitis.

It is felt the answer to micrococcal mastitis lies in more knowledge about how a mammary gland is able to adapt itself to the presence of bacteria.

REFERENCES

1. Schalm, O. W., and G. Woods, *Micrococcus Pyogenes* in Bovine Milk II. *Am. Jour. Vet. Res.*, 14:534, 1953.

2. Hodges, H. G., New York State Mastitis Research and Control Program. Proc. U. S. Livestk. Sani. Assn., 1955, pp. 236-243.

3. Cadness-Graves, Williams, Harper, and Miles. *Am. Jour. Clin. Patho.*, Tech. Bul., no. 3; 83, 1945.

4. Bray, J., and E. D. King, Phenolphthalein as a Reagent for Demonstrating Phosphatase in Bacteria. *Jour. Path. Bact.*, 54:287, 1942.

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Dean Allam in Mexico

Dr. Mark W. Allam, dean of the School of Veterinary Medicine of the University of Pennsylvania, is in Mexico as international consultant to the National School of Veterinary Medicine there. His assignment is being done under the auspices of the Pan American Sanitary Bureau, Regional Office of the World Health Organization.

This project is set up at the invitation of Latin American countries and is designed to assist in raising the teaching levels within the schools of veterinary medicine and to incorporate more of the practical aspects into the curricula.

Doctor Allam has been asked to survey present teaching methods and facilities; to present lectures and demonstrations; to establish methods of communication and other means of technical interchange and mutual assistance between veterinary schools; to assist the dean in developing ways by which the school can provide practical assistance to the national, provincial and local public health programs in regard to the biological aspects of food control, and to assist the dean in preparing proposals for fellowship training of key members of the teaching staff.

▾ ▾ ▾

Leptospirosis in cattle is a relatively new disease in the United States, first described in 1943. *L. pomona* is the most frequently identified species.

A Report on the Coccidiostatic Action of Nicarbazin® in Chicks Experimentally Infected with *Eimeria tenella*

R. F. SHUMARD,† Ph.D., and D. F. EVELETH,† Ph.D., D.V.M., Fargo, North Dakota

Recent literature indicates that field strains of coccidia of chickens are becoming resistant to drugs. Cuckler and Malanga[1], working with 40 field strains of allegedly resistant coccidia, state that 43% of those were resistant to nitrophenide, 45% to sulfaquinoxaline and 57% to nitrofurazone. These workers were able to experimentally induce resistance of one strain of *Eimeria acervulina* and two strains of *Eimeria tenella* to sulfaquinoxaline. They also found that nicarbazin inhibited all 40 strains of coccidia regardless of sensitivity or resistance to other drugs.

Materials and Methods

Sixty, five-week-old, battery raised New Hampshire chicks were allotted to four groups without regard to sex. Rations fed the chicks were of a commercial non-medicated crumble-type feed. A 10% premix containing nicarbazin was mixed with the crumblized feed of groups 2 and 4*. Food and water were kept before the birds at all times. All birds were weighed daily and daily group feed consumptions were recorded.

Five days after the chicks were placed on their respective rations each of those in groups 3 and 4 were given 50,000 sporulated *E. tenella* oocysts *per os*. (This strain is one we are maintaining at this laboratory. It was obtained from Beltsville, Maryland). The trial was continued for 13 days following infection.

Results and Discussion

No toxicity was noted due to the drug. Four birds of 15 died due to cecal coccidiosis in the infected, non-treated group. No birds died in any of the other groups, although symptoms of acute coccidiosis occurred in the treated-infected group.

Uninfected, non-treated birds gained 207% of their initial weight while on the trial; uninfected, nicarbazin treated birds gained 217%; infected, non-treated birds gained 117%; and infected, nicarbazin treated birds gained 158%. Infected, nicarbazin treated birds gained an average of 40.98 gm. more per bird than did the surviving non-treated infected birds.

Uninfected, non-treated chicks consumed 2.11 gm. of feed in order to gain 1 gm. of body weight; uninfected, nicarbazin treated chicks consumed 2.05 gm.; infected, non-treated chicks consumed 3.12 gm.; and infected, nicarbazin treated chicks consumed 2.69 gm.

Conclusion

Within the limits of the experiment described, nicarbazin treated feed at 0.0125% was effective in preventing mortality due to cecal coccidiosis in five to six-week-old chicks. No toxicity was noted at the dosage given.

REFERENCE

1. Cuckler, A. C. and Malanga, C. M., Studies on Drug Resistance in Coccidia. *Jour. Parasitol.*, 41:298, 1955.

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Erratum

In reporting diagnosis of listeriosis in a skunk by Dr. F. M. Bolin, *et al*, of the North Dakota Agricultural Experiment Station, Fargo, it was stated (*Vet. Med.*, 51:88 [Feb.] 1956) that Negri bodies were revealed on impression smears.

This latter statement was incorrect and should have been stated as in the *Bulletin*, "Impression smears of the brain were negative for Negri bodies." The importance of this is that listeriosis was not a concurrent infection with rabies but the probable etiological agent responsible for symptoms of staggering observed by the person submitting the head for laboratory diagnosis who presumably killed what was suspected as a rabid skunk.

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From a series of studies of marketing margins, Department of Agriculture statisticians report that "—farmers are now getting only 39 cents of every dollar spent for food in the retail store", the smallest amount since 1940 and in contrast to a recent peak of 53 cents in 1945 and 42 cents in 1954. Increased processing and transportation costs were mentioned as responsible for excessive "marketing spreads".

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†From the Department of Veterinary Science, North Dakota Agricultural College.

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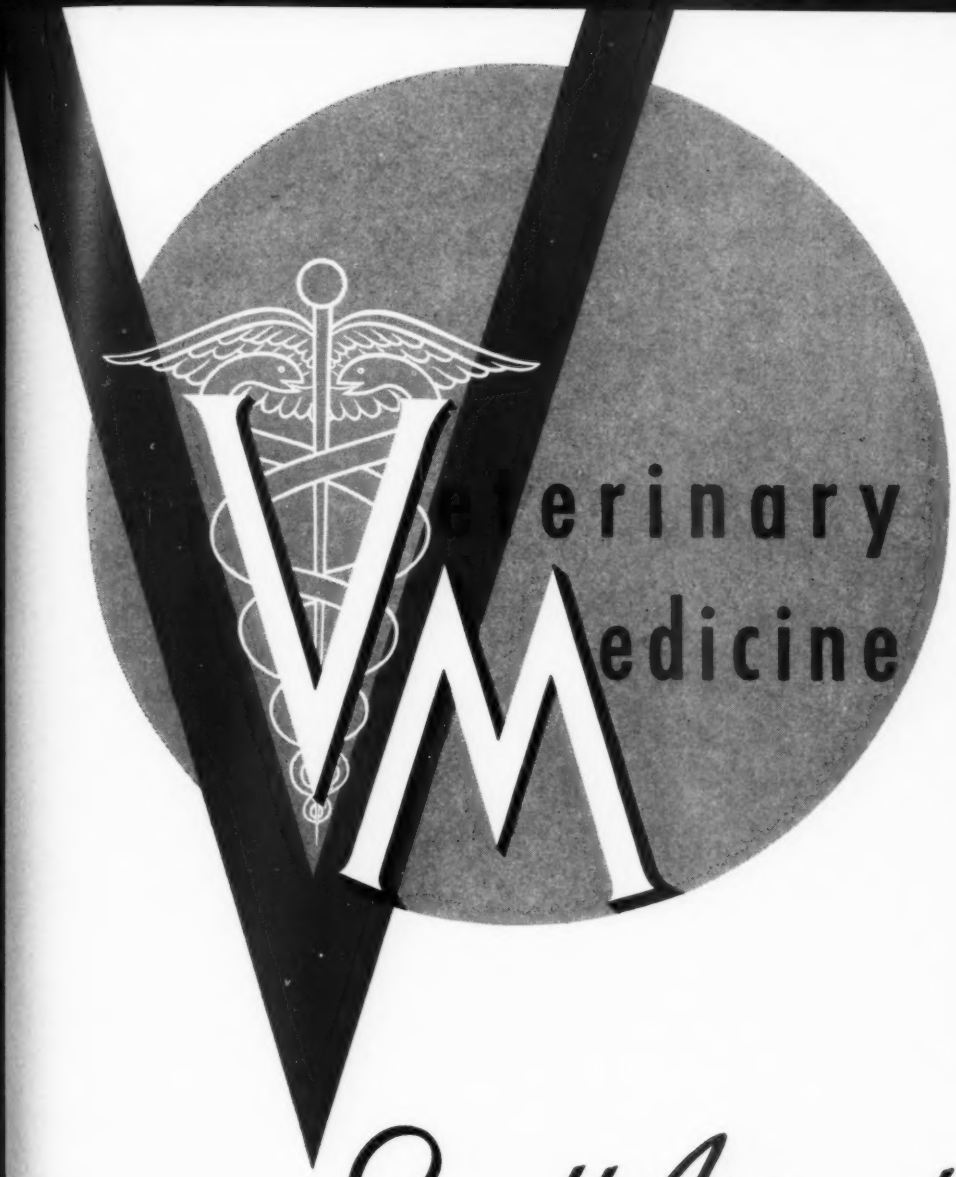
*Feed was mixed so that it contained 0.0125% nicarbazin. The balance of the premix was composed of corn distillers' dried grains, wheat standard middlings, and dried extracted Vitamin B_{12} fermentation solubles.



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Cardioplasty For Achalasia In The Dog

C. F. B. HOFMEYR, B.V.Sc., Pretoria, South Africa

ACHALASIA, or cardiospasm, designates any condition in which there is obstruction to the passage of food from the esophagus to the stomach in the absence of an organic stricture.

Review of the Literature

Achalasia is well known in man, but appears to have escaped the notice of veterinary clinicians. Kirk[1] quotes Schnelle as having seen six cases in dogs with the stomach and entire esophagus flaccid and dilated. It was assumed that the condition was neurogenic. However, general flaccidity is not characteristic of achalasia and Schnelle's cases appear to be of different type.

Devine[2] states that in man "as cardiospasm may arise on the one hand with a dyspeptic pattern in which pain may be a prominent feature, and on the other hand with a dyspeptic syndrome in which pain is absent, it is not surprising that it may be confused with gastric affections and it is not uncommon for it to remain unrecognized". Devine[2] further states that the *x*-ray shadow may resemble the lower end of a turnip and the esophagus is smoothly round. He advises dilatation by hydrostatic pressure or, in extreme cases, by performing gastrotomy and using the fingers to dilate the cardia slowly and gently.

Johnson and Kirby[3] also prefer nonsurgical therapy. They describe two methods of cardioplasty, one by Wendel and one by Gröndahl, but, in their opinion, these operations are unsatisfactory.

Franklin,[4] who made an extensive study of operations on the esophagus, mentions that Knight and Adamson[6] produced achalasia in cats by bilateral vagal section and prevented onset of cardiospasm by simultaneous sympathectomy. Hill[6] considered the cells of the plexus of Auerbach as vagal relays and degeneration of these cells has been described by Rake[7] in cardiospasm. Etzel[8] regarded vitamin B_1 deficiency as responsible for the degeneration. Bremer[9] also mentions dysfunction of the plexus of Auerbach as the most likely cause of achalasia. The tentative conclusion, therefore, is that achalasia will result if sympathetic action is increased and vagal tone decreased or if factors are present preventing vagal effect.

Franklin[4] advises hydrostatic pressure as the first step in treatment. He then describes Heller's operation, which can be performed through the abdomen or thorax. The results are regarded as satisfactory. Bremer[9] supports this view.

Plummer[10] mentions that the onset of achalasia may be sudden, but usually it is more gradual. He suggests three stages *viz*: (1) Intermittent difficulty in swallowing, possibly associated with discomfort and choking, (2) regurgitation while eating, (3) following dilatation of the esophagus, food may accumulate and be regurgitated at irregular intervals.

In the dog achalasia is uncommon, but certainly not rare. Once familiar with it, the diagnosis does not present great difficulty. With regard to the etiology, nothing new can be added.

Symptomatology

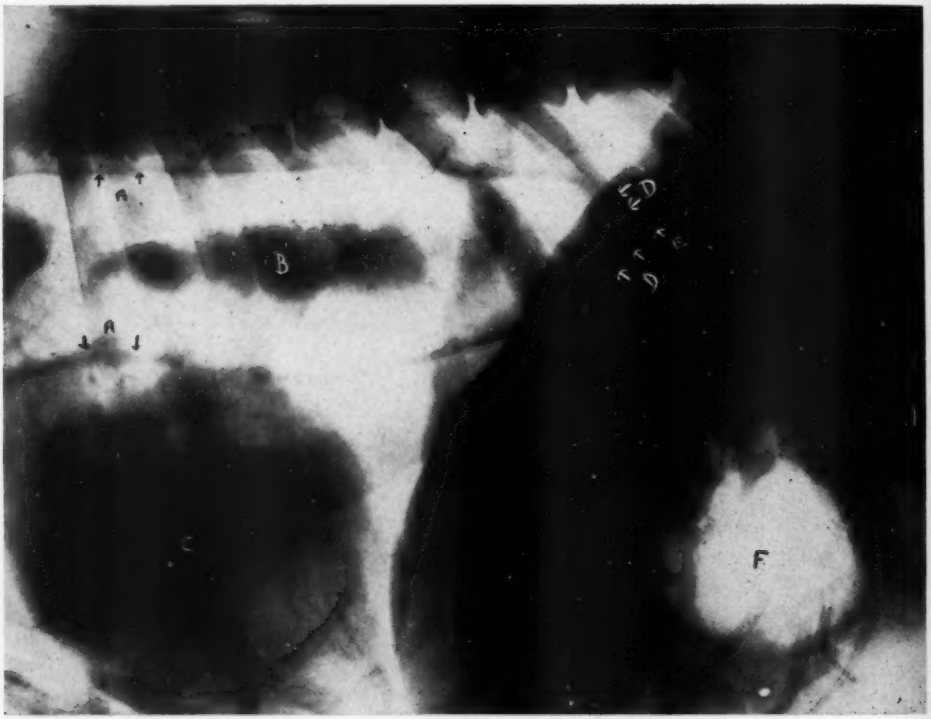
The condition in dogs has appeared to be painless, unlike some cases in man; thus confusion with gastric affections is easy. Every case seen was in a dog of fairly large size. The three stages of Plummer[10] admirably sums up the history, which varies according to the stage and the severity of the condition. The clinical examination is negative until insufficient nutrition causes a loss of weight.

Diagnosis

Professional assistance usually is not sought until the condition becomes objectionable to the owner. As any brain, liver, or kidney state leading to vomition would by that time be readily diagnosable, suspicion centers on chronic gastritis and achlorhydria. In the former the appetite is capricious, while in the latter undigested food usually is not vomited until some hours after a meal. Stomach contents obtained by stomach tube are acid-free. Pyloric spasm should be borne in mind, although it appears to be rare. Hofmeyr[11] reported a case illustrated with skiagraphs, which indicated the nature of the ailment. Projectile vomiting was characteristic in this case.

The appetite of the dog with achalasia is undiminished, but the food is returned during or just after a meal or fluid is brought up at intervals between meals. Since the food and fluid are held up at the cardia, the greatly distended esophagus acting as a reservoir, its ejection takes place without effort and apparently occurs unexpectedly and irresistibly. In true vomition some effort is always perceptible. If no acid is present in the returned food or fluid, then the conclusion is that the stomach has not been entered, the sole exception being in a case of complete achlorhydria.

Dysphagic dyspepsia also can be due to a



Skiagraph of terminal esophagus in a dog: (A.) Tremendously dilated esophagus, (B.) residual barium in the esophagus after a barium meal, (C.) heart shadow, (D.) cardia, which is much narrowed, (E.) small amount of barium caught in the contracted opening of the cardia, (F.) gastric air bubble.

diverticulum or stenosis of the esophagus. Radiological examination is essential to differentiate and should be taken within a few minutes of a barium meal. The barium held up in the greatly distended terminal esophagus is diagnostic, provided signs of a diverticulum or stenosis are absent. Human patients are said to show an absence of the gastric air bubble. In the canine cases *x*-rayed the bubble was present. Postural difference can account for this dissimilarity. The following case is typical of achalasia in the dog.

Case Report

A four-year-old Ridgeback bitch (a South African breed the size of a Dobermann Pinscher) had a history of regurgitation during the preceding seven weeks. This started gradually with vomiting and eating grass. Food and fluid were returned about 20 times a day — food during and immediately after, and fluid between meals. The dog lowered its head and the ingesta was returned without effort.

Clinical examination was negative. Radiological examination showed skiagraphs similar to the one illustrated here. The patient was operated as described below, the incision into the esophagus and stomach traversing all layers.

The patient recovered and was discharged a week postoperatively. The patient regurgitated food about once every alternate day for two weeks. A semi-liquid diet was continued for a further week after which the diet was normal. Good health without vomiting has been maintained for two years.

Treatment

As few clients are willing to face long periods of treatment, often with a doubtful prognosis, nonoperative manipulations have little future in the treatment of achalasia in the dog. The same applies to manual dilatation via gastrotomy as advised by Devine[8] in man. The treatment of choice appears to be an operation on the terminal esophagus and stomach. Because the dog has a relatively narrow chest and the diaphragm forms a high dome, the cardia is not easily accessible by laparotomy. The preferred route is through the chest.

The Operation

As both lungs collapse in the dog when one side of the chest is opened, it is necessary to provide a suitable respiration pump attached to an endotracheal catheter with an inflatable cuff to provide forced respiration. The author uses McGill's design. As Secord[13] has given an adequate survey of the equipment for and technic of forced respiration, these matters will not be discussed here.

Food and fluid are withheld from the patient for at least 12 hours preoperatively. The costal area on the left side is shaved and prepared. The anesthetic used is nembutal® intravenously.

The operative technic is after Heller with modifications to suit the canine patient. An incision is made in the eighth intercostal space, the full length of the ribs and deepened to the pleura. The pumping apparatus is held in readiness and put into operation as soon as the pleura is punctured. Unless the anesthetic has greatly depressed the respirations, the strength of and interval between the inspiratory efforts are a good guide as to the degree of aeration of the lungs. Underventilation leads to exaggerated movement of the chest wall and overventilation to cessation of respiratory movements. The use of this fact will be shown later.

The terminal esophagus is exposed by inserting rib retractors into the wound. By means of a sterile cloth the esophagus is brought through the wound. This is possible owing to the elastic mediastinum and the fact that the esophagus appears to be elongated. According to Bremer[9] it may become tortuous in man, but this has not been seen in the dog. Traction by an assistant brings the esophageal hiatus to the surface of the wound. A round-bodied instrument is passed underneath the esophagus and placed transversely across the wound, preventing the organ from slipping back into the thorax.

Two methods have been used by the author. A large series of cases is necessary before any opinion can be expressed as to their comparative merits. An incision is made on the latero-dorsal aspect of the esophagus, beginning about 2 in. (5 cm.) from the cardia, continuing caudally to the esophageal hiatus, which is enlarged by another incision carried in a latero-dorsal direction for a sufficient distance to expose the stomach wall, *i.e.* about 1½ in. (3.75 cm.). At this site the knife does not injure any of the major blood vessels. According to Heller's method (extra mucous cardiomyotomy) this incision is made just deep enough to sever all the muscle fibres in the wall of the cardia and the stomach without injuring the mucosa, *i.e.* similar to the operation for the relief of pyloric stenosis in in-

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fants. With achalasia there is uneven hypertrophy of the esophagus, making extreme care necessary. The other method is incising through all the layers including the mucosa and entering the lumen of the esophagus and the stomach. In both methods the incision is closed by suturing transversely with catgut on an atraumatic needle, employing a single layer Connell suture. Some stomach wall is pulled through into the thoracic cavity and secured to the diaphragm wound by interrupted sutures. This is to prevent cicatricial contraction causing stenosis later. In man this is unnecessary and possibly it is the same in the dog. The rest of the wound in the diaphragm is closed by continuous catgut sutures.

If, during the operation the movements of the chest wall make an intended maneuvre difficult or impossible, hyperventilation of the lungs is deliberately brought about by increasing the pumping rate. Respiratory movements cease and delicate surgery is possible.

The esophagus is returned to its normal position and the operation is completed by closing the wound in the usual manner for thoracotomy wounds.

The diet of convalescence follows the pattern for stomach operations. Occasional vomiting might take place, but immediate improvement is apparent. Cessation of vomiting most likely accompanies return to a more normal diameter of the dilated terminal esophagus. It is emphasized that, with the small series of cases diagnosed through the years and the fact that all could not be operated for various reasons, much remains to be learned of the clinical pattern and the operation. If the author earlier had been aware of the possibility of achalasia in the dog, many more cases might have been recognized. It is hoped that others will help fill the hiatus in our knowledge about this condition.

Summary

A brief review of the literature of achalasia in man is given.

Achalasia and the remedial operation are described in the dog, apparently for the first time.

Acknowledgment

The author is indebted to Prof. J. K. Bremer, Department of Surgery, Medical Faculty, Pretoria University, for helpful suggestions and for the use of the surgical library.

REFERENCES

1. Kirk, H., Index of Diagnosis. Baltimore, Md., Williams and Wilkins Co., 1939, p. 209.
2. Devine, Sir H., Surgery of the Alimentary Tract. Bristol, J. Wright & Sons, Ltd., 1940, pp. 13-23.
3. Johnson, J., and Kirby, C. K., Surgery of the Chest. Chicago, Ill., Year Book Publ., Inc., 1952.
4. Franklin, R. H., Surgery of the Oesophagus. London, Edward Arnold & Co., 1952, pp. 102-111.
5. Knight, G. S., and Adamson, W. A. D., Achalasia of the Cardia. *Proc. Royal Soc. Med.*, 28:891, 1935.
6. Hill, C. F., Contribution to Our Knowledge Enteric Plexuses. *Phil. Trans. Royal Soc. (London)*, 215:355, 1927.
7. Rake, Epithelioma of the Oesophagus Associated with Achalasia of the Cardia. *Lancet*, 2:682, 1931.
8. Etzel, E., Achalasia. Guy's Hosp. Repts., 8:158, 1937.
9. Bremer, J. K., Achalasie van die Oesophagus—Kardiospasme. Pub. Med. Fac., Univ. of Pretoria, 1952.
10. Plummer, H. S., Cardiospasm with Report of Cases. *Jour. Minn. Med. Assn.*, 26:419, 1906, and 51:549, 1908.
11. Hofmeyr, C. F. B., Pyloric Spasm in a Dog. *Jour. So. Afr. Vet. Med. Assn.*, 23:47, 1952.
12. Second, Allan C., Diaphragmatic Hernia. Canine Surgery, 3rd ed., Evanston, Ill., Am. Vet. Publ., 1952, pp. 369-375.

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Veterinary Curriculum at Cambridge

It is of unusual interest to American veterinarians that the University of Cambridge located in the city of Cambridge, England, has now established a six year curriculum leading to the degree Bachelor of Veterinary Medicine. This new veterinary school is the youngest of six comparable courses of study now established within the universities of Great Britain. The Cambridge School of Veterinary Medicine was formally dedicated and its splendid new building opened by Her Majesty the Queen. She was accompanied by her husband the Duke of Edinburgh. We are certain that those engaged in the profession of veterinary medicine feel highly honored by the distinction reflected on them by the presence of these august persons during the auspicious ceremony of dedicating the new school of veterinary medicine in the academic surroundings of the great University of Cambridge.

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Weil's disease is the term used for human leptospirosis (spirochetal jaundice) caused by *Leptospira icterohemorrhagiae;* canicola fever for *L. canicola* infection. Infection in any animal by any organisms of the genus Leptospira usually is referred to in veterinary literature as leptospirosis, although periodic ophthalmia, swineherd disease, and possibly other named diseases have a Leptospira as etiological agent.

Effect Of Cortisone, ACTH, And Vitamin B_{12} On Distemper In Ferrets

V. J. CABASSO,* Sc.D., M. R. STEBBINS,* M.S., and D. W. JOHNSON,* D.V.M., Pearl River, New York

THE management of central nervous system diseases of the dog is one of the most vexing problems in small animal practice. This is particularly true of conditions resulting from infection with distemper virus, and their treatment by a variety of regimens has, over a long period, yielded disappointing results. Encouraging reports, however, have appeared in print recently attributing remarkable therapeutic effects to cortisone, ACTH and vitamin B_{12}, given separately or in combination, in the preconvulsive or early convulsive stages of distemper encephalitis. Unexpected recoveries were observed by Sudduth[1] following single or multiple treatments with chick embryo distemper vaccine, ACTH, and sterile milk. Using cortisone, ACTH, and 5% glucose or Ringer's solution as supportive treatment, as well as vaccine therapy in some of the animals, Candlin[2] reported a 70% recovery rate among 51 dogs presenting hyperkeratosis with or without central nervous system involvement. Bunce[3] obtained a recovery rate of 72% with improvement in an additional 8% of a series of 470 dogs suffering from different conditions, the majority from diseases of the central nervous system due to infection with distemper virus. The treatment consisted of a mixture of ACTH and massive doses of vitamin B_{12} administered daily for two to 14 days.

The object of the experiments to be reported here was to determine whether hormone and vitamin B_{12} treatment would also influence experimental distemper infection in ferrets.

Materials and Methods

Distemper Virus. Ferrets were exposed by the inoculation of a 20% ferret spleen suspension infected with the Lederle stock strains of virulent distemper virus. The suspension previously had been dried from the frozen state in ampoules and titrated in ferrets. The infecting dosage of 1 ml., representing about 1,000 MLD's* of virus, was administered to experimental animals by the subcutaneous route.

Ferrets. Healthy, young animals were obtained from the same source as reported earlier[4] and maintained under the same conditions of strict isolation.

*Cortisone** and ACTH†.* The commercial preparations used in this study consisted of a saline suspension of the former containing 25 mg. cortisone acetate per 1 ml. and of a solution of the latter in gelatin with 60 units ACTH per 1 ml.

Vitamin B_{12}. This was a concentrated aqueous solution of the vitamin containing 4,000 micrograms per ml.

Treatment of animals with either the hormones or ACTH and vitamin B_{12} always was administered by the intraperitoneal route and instituted immediately after infection.

Experimental and Results

Thirty-two ferrets were inoculated with distemper virus and divided into four groups. The first three groups were immediately put on the treatment regimens described in the accompanying table, and the fourth group was kept untreated to serve as controls. Additional controls were provided by treating three groups of uninfected animals for the same length of time as the virus-inoculated ferrets, as also shown in the table.

The results clearly indicated that none of the treatment regimens employed had any dramatic effect on the evolution and outcome of the disease in the ferret. Regardless of the type of treatment, 100% of the infected animals died, whereas treated controls survived

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*Viral and Rickettsial Section, Research Division, American Cyanamid Company. (With the technical assistance of H. Klaver).

*Minimal lethal doses.

**Cortone® acetate (cortisone acetate, Merck), Sharp and Dohme, Phil., Pa.

†Adrenamone® (veterinary corticotropin [ACTH] in gelatin), Armour Veterinary Laboratories, Chicago, Ill.

the 30-day observation period with no noticeable ill-effects as a result of treatment. The only perceptible difference between treated and untreated animals was a slight delay in the appearance of the first signs of illness in the former and some extension of their survival time. Perhaps the most significant prolongation of life was in group two, which received the double cycle of cortisone-ACTH treatment. The average time to death in this group was about six days longer than that of control animals.

Discussion

The experiments described here were intended to compare the effect of hormone therapy in distemper-infected ferrets to the encouraging results reported on the use of cortisone and ACTH in dogs affected by this virus presenting, in some cases, signs of distemper encephalitis. Unlike the disease in dogs, distemper in the ferret is associated with no secondary bacterial invaders and with little or no nervous system involvement. Nevertheless, the disease always terminates in the death of 100% of infected ferrets which, therefore, seemed to be the experimental animal of choice for investigating any possibility of direct action of the treatment on distemper virus.

As was expected, the therapy employed had little or no effect on the disease in ferrets, clearly indicating the absence of any action of the hormones on the virus proper. The longer survival of animals under the most intensive treatment (two courses of cortisone and ACTH) may well be attributed to the fact that treated ferrets continued to eat practically until death, whereas untreated animals generally lost their appetites with the onset of distemper signs. The beneficial effect of ACTH and cortisone on appetite and the sense

(Continued on page 122)

TABLE 1. Treatment of Distemper Infected Ferrets with Either Cortisone-ACTH or ACTH-Vitamin B_{12}

Route of Virus Inoc.	Ferret Group No.	No. of Animals In Group	Treatment Regimen (I.P.)	Total Days of Treatment	Survival and Range (Days)	Average Time to Death (Days)
1000 MLD's sub. cu.	1	12	Cortisone: 25 mg. twice daily 5 days ACTH: 25 to 12 units daily 7 days	12	0/12 13-23	15.6
	2	6	Cortisone: 25 mg. twice daily 5 days ACTH: 25 to 12 units daily 7 days Cortisone: 25 mg. twice daily 5 days ACTH: 30 units, 1 day	18	0/6 16-22	18.7
	3	6	ACTH: 25 to 9 units daily 12 days Vitamin B_{12}: 500 mg. daily 12 days	12	0/6 12-18	14.7
	4	8	None: virus controls		0/8 11-15	12.8
None: Treatment Controls	5	2	Cortisone: 25 mg. twice daily 5 days ACTH: 25 to 12 units daily 7 days	12	2/2*	
	6	4	Cortisone: 25 mg. twice daily 5 days ACTH: 25 to 12 units daily 7 days Cortisone: 25 mg. twice daily 5 days ACTH: 30 units, 1 day	18	4/4*	
	7	4	ACTH: 25 to 9 units daily 12 days Vitamin B_{12}: 500 mg. daily 12 days	12	4/4*	

* Survived thirty days.

Removal of the Canine Fourth Premolar Tooth†

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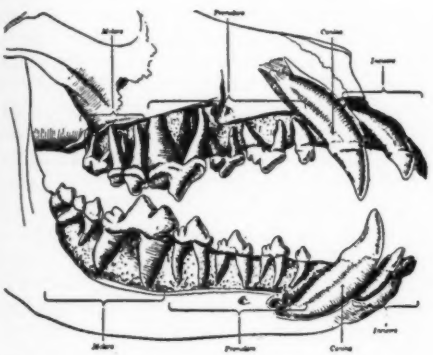
Infection of the maxillary sinus is the primary indication for removal of the fourth, superior, premolar tooth in the dog. Infection may be established through traumatic fracture of the tooth or by reason of infectious, alveolar periostitis.

Many cases are presented with a history of a chronic, unilateral, nasal discharge. Owners of other patients complain of an offensive breath. Some exhibit a swelling, from the size of a pea to that of a small hen's egg, under the orbit on the affected side. Examination of long standing cases may reveal a fistulous tract into the maxillary sinus just below the eye, with exudates draining down the side of the face.



Canine permanent teeth

Illustration from 5th edition of Topographical Anatomy of the Dog, by O. C. Bradley, revised by T. Grahame. By permission of Macmillan, publisher.

Relief of symptoms and correction of the sinusitis is effected most expeditiously by removal of the superior, fourth premolar and establishing good draining through the alveolus. The operation also is indicated in cats affected with chronic sinusitis, a frequent sequellae of pneumonitis.

Doctor Beamer then proceeded to demonstrate technic for removing the superior fourth premolar of an anesthetized patient, commenting on the technic employed as he proceeded with extraction.

The first step in removal is to loosen the gum entirely around the tooth with a dental elevator. Care must be observed to avoid excessive trauma. I usually hold my thumb ahead of the point of the elevator to better control direction and penetration. Palatine vessels may be damaged unless care is observed while working with the elevator on the medial aspect of the tooth. After loosening the gums, the elevator is forced between the roots by rotation and elevation.

A small hack saw blade is used to separate the tooth into two pieces so that divergent roots may be extracted without bone damage. Tooth cutters tend to crush and splinter. After separation, the two portions of the tooth are loosened by gentle pressure and rotation of the elevator. I prefer to remove the anterior portion first with a selected extractor, then the posterior portion.

To invade the sinus, one must select the medial alveolus of the anterior two-root portion of the tooth. This is accomplished by inserting a small intermedullary pin attached to a chuck to penetrate the thin, bony plate into the sinus without undue fracture. After penetration, opening can be enlarged to suit by means of an elevator used as a reamer.

Aftercare includes flushing out the sinus with saline solution and follow by injection of a solution of penicillin and streptomycin.

Periorbital Abscess

So-called periorbital abscess or abscess in the orbital fossa, is not uncommon.

Patients are presented with a history of anorexia. Body temperature is elevated usually to 102 to 105 F. Examination reveals extreme pain when the mouth is opened even slightly. This of course, is due to pressure of the coronoid process against affected tissue. Screams of pain on attempts to open the mouth are diagnostic. In many cases one observes a slight protrusion of the orbit and, in the early stages of some, it has been mistaken for acute glaucoma.

The patient ordinarily is prepared for surgery by intravenous injection of short-acting barbiturates. Examination of the mouth under anesthesia frequently discloses discoloration of the mucous membrane immediately posterior to the dental arcade. A small incision is made into this area with a no. 11 Bard-Parker blade. This is not carried to deeper layers but if the abscess is superficial the blade may penetrate the wall, otherwise the incision is deepened and enlarged by forceps, moving

†Presented at the 22nd annual meeting of the American Animal Hospital Association, Detroit, Mich., May 4-7, 1955.

*Head, Small Animal Medicine and Surgery, School of Veterinary Medicine, Texas A. & M. College.

them backward and upward at approximately a 45° angle. After adequate drainage is established, the abscess may be irrigated. Healing is ordinarily prompt and without complications.

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Blood Transfusion of the Cat Through the Medullary Canal†

L. E. GREEN, D.V.M., Akron, Ohio

An alternate method of giving blood transfusions to cats and small puppies is through the medullary canal. We have been using this method for at least five years and have found it to be an economical and practical procedure.

The equipment required includes a 17-gauge, 2 to 2½ in. needle with the point buffed slightly. This serves as the medullary cannula. An intramedullary pin (same diameter as the needle), pin-chuck, Bard-Parker blade, and a 5 cc. glass syringe complete the necessary materials.

Epidural anesthesia is given by way of the lumbosacral junction. For these small patients I like to use a 23-gauge, ¾ in. needle.

First, locate the trochanteric fossa of the femur using the technic employed when pinning a femoral fracture. Make a small skin incision over the area and then insert pin until it is free in the medullary canal. Withdraw pin, then insert needle through bone opening and mount apparatus for continuous drip. We formerly anchored needles in position but found this unnecessary. After treatment, needle may be plugged and left in place for subsequent treatment, or may be withdrawn and inserted the following day without severe discomfort to the patient. We have had this apparatus in position for several days, continuously, decreasing drip rate to 7 to 10 drops per minute. Satisfactory results have followed such methods for blood and parenteral fluids infusion.

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European workers, in discussing the therapy of eosinophilic myositis of the dog, indicate that up to the present time the best results have followed the use of ACTH.

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A much larger food budget would be needed in the average home if the vitamins, minerals, and calories supplied by milk had to be secured from any other source.

†Presented at the 22nd annual meeting of the American Animal Hospital Association, Detroit, Mich., May 4-7, 1955.

Factors Associated with Otitis

A European survey regarding the relationship between ear cropping and otitis externa in dogs indicates that in 522 dogs with cropped ears, otitis was observed in 6.7%; 1,772 dogs with normally erect ears had 4.2% otitis. In 2,645 dogs with normally pendant ears, otitis was observed in 7.1%, and in 795 uncropped dogs with hairy, semi-erect ears otitis occurred in 13.3%. The conclusion drawn is that ear-cropping has no influence in preventing otitis; also that a heavy hair growth in the external ear favors the development of inflamtory processes in the ear canal.

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Effect of Cortisone, ACTH, and Vitamin B_{12} on Distemper

(Continued from page 120)

of well-being they induce have been substantiated fully, and may explain in part the success obtained in treating distemper in dogs, for which the disease is not always fatal. Furthermore, the well-known action of ACTH and cortisone in reducing inflammation, alleviating pain and controlling fever should have some effect on distemper encephalitis, particularly if Sudduth's theory[1] of the allergic nature of this condition has a real basis.

Summary

Distemper-infected ferrets were treated by various regimens consisting of daily injections of either cortisone and ACTH or ACTH and high levels of vitamin B_{12}. No dramatic effect on the evolution and outcome of the disease was observed, and all of the infected animals developed the disease and died. A longer survival time was noted following the most intensive cortisone-ACTH regimen, but this may be attributed to the fact that treated animals continued to eat practically until death, whereas untreated ferrets went off feed with the first appearance of distemper signs.

REFERENCES

1. Sudduth, W. H., Treatment of the Encephalitic Stage of Canine Distemper. *N. Am. Vet.*, 35:360 (May), 1954.

2. Candlin, F. T., Cortisone and ACTH in the Treatment of Chronic Distemper (So-called Hard-Pad Disease). *N. Am. Vet.*, 35:764 (Oct.), 1954.

3. Bunce, D. F. M. II, An Approach to the Treatment of Certain Neurological Conditions in Dogs. *Vet. Med.*, 49:537 (Dec.), 1954.

4. Cabasso, V., and Cox, H. R., Propagation of Canine Distemper Virus on the Chorio-Allantoic Membrane of Embryonated Hen Eggs. *Proc. Soc. Exp. Biol. and Med.*, 71:246 (June), 1949.

Topical Use Of Tetracycline In Eye, Ear, And Skin Conditions In Small Animal Practice

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THE use of various ointment preparations has become routine in small animal practice in the treatment of infections of the eye, ear, and skin, and postoperatively. Ointments containing antibiotics have proved particularly useful because of their wide bacteriostatic or bactericidal activity, and because it is often difficult to determine specific organisms causing such conditions.

This is a clinical report on 51 dogs and five cats in which tetracycline hydrochloride*, in the form of a topical ointment, was used on common, external conditions, and in the form of an ophthalmic ointment for various eye conditions in 11 animals.

Clinical Use

Tetracycline topical ointment contained 30 mg. of tetracycline per gram of petrolatum-lanolin base (3%), and the ophthalmic ointment 10 mg. per gram of petrolatum-lanolin base (1%). The ointments were applied directly to the involved area as the condition of the animal indicated.

Topical

Acute Otitis. The extreme pain and irritation observed in acute, purulent otitis externa is well known to all practitioners. The use of tetracycline topical ointment in these cases was particularly gratifying. Seven dogs were treated; six were completely healed and one markedly improved. The ointment was applied to these ears without the usual preliminary cleansing of the ear canal. This avoided the extreme reaction of the dog to cleansing of the highly inflamed ear or ears, and client reaction was uniformly good. Marked response was noted as the inflammatory reaction almost always had subsided by the following day. Complete healing was usually evident in four or five days. If cleansing of the ear canal was necessary, it was always put off until the second or third day of treatment when pain was minimal. This method of treatment has proved eminently satisfactory in this practice, and more pleasing to client and patient than older methods that required canal cleansing at the height of inflammation and pain to assure success.

For cleansing ears, swabs wet with water were used. It is my opinion that irritating agents such as ether and alcohol should never be used in inflamed ears. The reaction of the dog to application of these agents should be reason enough for any practitioner to discard their use as a cleanser.

Observation over several years indicates that an ointment that will melt at body temperature is a better therapeutic agent in the treatment of otitis than is a powder or a drug in an aqueous vehicle. Powder preparations in the ear appear contraindicated unless the preparation is soluble in the ear discharges. Preparations in an oil base have proved successful, but generally do not appear as effective as an ointment in treatment of acute otitis.

Chronic Otitis Externa. Recovery often necessitates prolonged treatment and, unless the owner is cooperative, failure results. The experience reported here would indicate that treatment with tetracycline ointment can be undertaken with confidence. Twelve dogs were treated, six of which recovered clinically within eight days. Some of these were of several months duration on presentation. Four additional cases required treatment for two weeks, or there was recurrence in one month necessitating retreatment. In one of these, treatment with another antibiotic ointment was necessary before recovery resulted. Only two cases did not respond completely. Both improved following treatment, but did not heal. One has a long history of chronicity extending for more than one year, and undoubtedly will eventually require surgical drainage.

Moist Eczema. In five cases treated, symptoms of acute moist eczema were relieved dramatically by the application of tetracycline

*Polyotic — brand of tetracycline hydrochloride—Lederle Laboratories Division, American Cyanamid Corp., Pearl River, N. Y. used in these clinical studies.

ointment. All resulted in complete healing, generally within three or four days. In one animal, one treatment resulted in complete absence of all symptoms the day following initial application.

Inflammatory Conditions. Two animals with inflammation of the vulva and one with anal inflammation appeared to be best described as types of moist eczema. Only one case of inflammation of the vulva did not respond completely, but this also had been refractory to several other antibiotic ointments including two containing hydrocortisone. Subsequently, it was discovered that this dog suffered a cystitis, and correction of this condition relieved the scalding of the skin.

Two cases each of vaginitis and balanitis responded readily to treatment.

Lip Infection. Two dogs with bacterial lip infections were treated successfully. This was the moist, malodorous infection of the fold of the lower lip common in Spaniels. Recurrence after several weeks or months is not uncommon, but to date, these lesions have responded following treatment with tetracycline for two or three days.

Chronic Ulcer. The two cases of chronic ulcer reported were both feline patients. Both responded, but it appears that this type of skin condition required longer treatment periods than the majority of other cases. One required ten days and the other 12 days, for complete recovery.

Ear Crop, Surgical Incisions and Wounds. Twenty-one patients were treated for these conditions that are normally expected to respond to such treatment. Tetracycline ointment was used postsurgically on 12 dogs presented for ear cropping. Infection was absent, and it was believed that healing was faster, and that there was less incision interruption due to scratching when the ointment was applied daily to the cut edges. The use of an ointment is standard at this hospital, and tetracycline compares favorably with other antibiotic ointments used.

The use of tetracycline on infected surgical wounds in five animals resulted, in all cases, in disappearance of infection within three days. Infected wounds in four animals were cleared of infection within two to four days. The continued use of the ointment in open wounds was justified by prevention of infection which would have inhibited healing. Softening of the edges of the wound by the use of the ointment appeared to contribute materially to healing.

Ophthalmic

In all 11 cases treated, ophthalmic ointment was applied four to six times daily. In primary eye conditions, rapid clinical improvement was noted, usually within 48 hours. Nine of the 11 animals treated recovered in four to 14 days. The two dogs that did not recover were afflicted with the usual eye and conjunctival changes associated with advanced cases of the distemper complex. Temporary improvement was evident in one, but the condition recurred about one week later.

Conjunctivitis was diagnosed in five dogs, and all recovered, four within five days. In the fifth dog, an interstitial keratitis in the left eye complicated the condition, but recovery was evident in seven days.

Only one dog had a primary interstitial keratitis, the cause of which was not determined. The condition responded to tetracycline treatment and the keratitis cleared by the seventh day.

In one of the two dogs treated for corneal wounds, inflammation was subsiding within two days, and had disappeared by the end of five days. The ulcer that formed from the wound was slow in healing—more than two weeks—but there was no infection or discharge from the eye or ulcer. In the second dog, the wound healed well, but an interstitial keratitis that developed remained visible for at least three weeks.

One dog, struck on or near the orbit by a thrown baseball, showed a great deal of edema and inflammation of the conjunctiva. Treatment resulted in disappearance of all inflammation within four days without complication.

Comment

Only a small number of animals have been treated with ophthalmic ointment. If further experience bears out the results in these first few cases, tetracycline ophthalmic ointment should be a valuable aid in treatment.

Topical use of tetracycline ointment in the conditions reported has been gratifying. More than half of the patients recovered in the first week, with the majority of these recoveries recorded between the third and fifth days.

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You, too, can "honor the dead by helping the living". That is the slogan of the Veterans of Foreign Wars and you can do your bit by purchasing a Buddy Poppy during the week of Memorial Day when the VFW conducts its one and only sale to the public each year.

Group Practice

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The tendency in many fields of endeavor is to accomplish the best job with the least expenditure of effort. This concept may well be extended to veterinary medicine which, until the present time, has been primarily an individualistic effort. An attempt will be made here to assay some of the advantages and disadvantages of group practice and finally to point up some of the advantages by a financial resumé of single and group practice.

Many argue that there is basic strength in the individual actions of veterinarians and since they live or die by their individual efforts, they are acting in a true democratic spirit. When this is analyzed in the light of present knowledge of co-operative effort in the fields of medicine, law, and engineering, it seems the time has come to examine closely the advantages and disadvantages of such individual responsibility.

In order for a group practice to have any chance for success the idea of the great "I Am" must be abandoned. If a veterinarian is honest, he must make the following admissions to himself:

1. I can make mistakes in diagnosis, surgery, or treatment.
2. I do not know all there is to learn about therapeutics, pathology, and medicine.
3. I am not the best financier or business manager in the country.
4. I can learn to improve my handling of the public.

Unless these concessions are made by each individual entering into a group practice it is doomed to failure.

There are many types of group practice. The most obvious is the institution type, either headed by a veterinarian or a lay person, and this may be exemplified by the practices conducted under the auspices of veterinary schools or such institutions as the Angell Memorial Hospital in Boston. Another type is one where there is a single owner employing one or more assistants on a wage basis. A third is a limited partnership where there is a senior member and other veterinarians have a lesser roll in the partnership or corporation. A fourth type is where there is a partnership of veterinarians employing wage-earning assistants. A fifth would be a full group practice with equal ownership by more than two veterinarians.

In our discussion we will speak more about the last than the others, but what is true of one will, in general, apply to all group practices.

Advantages

These may be enumerated under three headings: (1) Professional, (2) financial, and (3) social and/or mental.

Professional.

1. A constant coverage of hospitalized cases by a veterinarian.
2. A chance to specialize in a particular branch of veterinary medicine, besides doing general work.
3. With a pooling of capital there should be a better physical plant.
4. More specialized equipment.
5. A better record system should result.
6. More safety checks on the progress of individual cases by virtue of their being reviewed by more than one clinician.
7. A greater chance to attend professional meetings and postgraduate courses.
8. Better opportunity to evaluate clinical data, having more time, more cases, and better records.
9. Competent assistance for involved surgery, or other procedures.
10. The employment of a laboratory technician.
11. The employment of a full-time receptionist-bookkeeper.

Financial.

1. A large hospital specifically built for veterinary use has a greater resale value than the ordinary converted establishment.
2. A steadier income should result.
3. A guaranteed income in case of illness, without the payment of insurance premiums.
4. Insurance for survivors with a greater realization of money for the sale of the share in the practice.
5. Increased buying should result in better buying price and less dead merchandise on the shelves.
6. Saving on duplication of various types of insurance.
7. Reduction in expenditures for duplicated equipment such as kennels, *x*-ray, laboratory, and office equipment.
8. Better collection methods, with a reduction of circulating "dead beats."
9. Easier financing arrangement with client-friends.

Social and/or Mental.

1. Regular hours of work.

2. More regular hours away from the practice.

3. More home life, less interrupted.

4. More time off for vacations.

5. Time to visit other veterinary establishlishments to improve public relations and technical ability.

6. Free time to partake in community activities.

7. Professional status increased because of cooperative effort in the eyes of the public.

8. Ease of mind knowing that while you are away there are competent people to handle all emergencies.

Disadvantages

Professional.

1. Many people want a particular doctor rather than the impersonal aspect of a group practice.

2. They may want assurance that a particular doctor handles the surgery or medical care of their animal.

3. More records means more time must be spent to evaluate the efforts of other veterinarians before taking over the treatment of any case in the hospital.

4. There may be a tendency to compromise rather than offend the professional ability of one's colleague.

5. The possibility of overlooking work on the assumption that it has been done by the other member of the group.

6. It may be argued that three sites will draw more people than one site.

Financial.

1. In any partnership or other group arrangement the financial investment or withdrawal will have to consume more time.

2. Expenditure of money may be resented by the minority dissenting opinion.

3. Financial committments of any of the partners means a liability of all the individuals.

Social and/or Mental.

1. One must assume the obligation of defending the opinions, social blunders, or misconstrued remarks of one's colleagues.

2. More free time does not necessitate the best expenditure of same. "The devil finds work for idle hands".

A sample of the business expenditures of a single and a group practice is illustrated below. The expenses are computed on the basis of a single practice with a gross income of $20,000. and a group practice, involving three veterinarians, with a gross income of $60,000.

	Single	Group	Probable Saving
Advertising	$ 100	$ 150	$ 150
Animal food	400	1,100	100
Banking charges	60	90	90
Car expenses	1,200	3,600	....
Hospital repairs	500	500	1,000
Drugs, *X*-ray supplies	2,000	4,000	2,000
Dues and charities	150	225	225
Equipment and grounds maintenance	500	750	750
Insurance, business	500	1,000	500
Laundry	100	200	100
Legal and collection fees	100	200	100
Oil, water, gas and electricity	840	1,260	1,260
Postage and express charges	100	200	100
Printing and office supplies	200	500	100
Professional services (technicians, et cetera)	100	....	300
Rents or interest on mortgage	1,200	3,600	....
Rubbish removal	100	200	100
Taxes	500	1,500	....
Telephone	420	840	420
Travel expenses and entertainment	200	600	....
Wages	4,000	10,000	2,000
Books and magazines	50	100	50
	$13,270	$30,515	$9,345

Net Profit:

Single practice $6,730 = 33% net return

Group practice (For each member) $9,828 = 50% net return

Since each veterinarian in the group should put in 1/3 less time in actual work, the return is even greater on the basis of hours work. Let us assume that the average man puts in 75 hours per week, and that in a group practice it should be reduced to 50 hours:

Single—75 hrs. x 50 weeks = 3,750 hrs. or $1.80 per hr.

Group—50 hrs. x 50 weeks = 2,500 hrs. or $3.93 per hr.

It may be seen from the above that a veterinarian may more than double his earning capacity per hour for a reasonable number of hours worked per week.

American Animal Hospital Association Announces Annual Meeting Plans

President William F. Irwin and Program Chairman James E. Greene, of the American Animal Hospital Association, announce that plans for the program of the forthcoming 1956 meeting of the Association at Hotel Fontainebleau, Miami Beach, Florida, May 23 to 26, are almost completed. Television, once again, will be a big feature of the program and will be made available for clinical demonstrations through the courtesy of Allied Laboratories and The Radio Corporation of America.

On Tuesday, May 22, the annual preconvention golf tournament will be held. Chairman Ivan C. Frederickson has extended an invitation to all members and guests and their wives to participate in this event.

The program will begin Wednesday noon, May 23, with a business luncheon for members, followed in the afternoon by a scenic boat trip to the newly-opened Seaquarium off the coast of Miami. The visit to the Seaquarium will include dinner there and return to the hotel. An invitation to make the trip is extended to members, visiting veterinarians, wives and other visitors to the convention.

The scientific program will begin on Thursday morning, May 24, with a dedication ceremony for the newly published Louis H. LaFond edition of Planning Your Animal Hospital. The scientific program will continue through Thursday, Friday, and until Saturday noon. At noon on Saturday, the meeting, for those wishing to attend, will adjourn to Havana, Cuba, where Dr. Federico Sanchez-Escoto is making arrangements to present a scientific program and entertainment by the Havana veterinarians. The group will return from Havana on Monday, the trip being made by chartered plane.

Special hotel reservation cards are available at the office of the executive secretary, Dr. Wayne H. Riser, 5335 Touhy Ave., Skokie, Illinois, and printed programs will be mailed on or about April 15.

The fine scientific program, the unusual setting of the Fontainebleau Hotel and other added attractions of this vacation land make this an unusual opportunity to enjoy a veterinary meeting.

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There was a decline of about 25% in reported cases of poliomyelitis in 1955 as compared with 1954. Probably not less than ¾ of this decrease can be attributed to a natural decline in incidence, and most of the remainder is probably due to immunization.—*Morb. and Mort. Wkly. Rept.*, January 6, 1956.

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Antibiotics are not recommended and have never been used at the Ohio Veterinary Clinic prior to, or following, uncomplicated surgical procedures.—*W. F. Guard, D.V.M.*

Hotel Fontainebleau, Miami Beach, Florida, site of American Animal Hospital Association meeting, May 23-26, 1956.

Laboratory Rats

The editor, Prof. Edmond J. Farris, of The Care and Breeding of Laboratory Animals* is the author of the chapter on the albino rat.

This animal, *Mus norvegicus albinus,* is the most commonly used laboratory mammal, and has been used in practically all fields of biologic investigation. They "are gentle, clean, easily handled, readily trained, and inexpensive to maintain." Homozygosity is desirable in experimental animals and must reach its apogee in the albino rat, the King "A" strain being in its 135th generation of brother-sister inbreeding when this chapter was written.

The female albino will begin reproduction at three months of age and continue for 12 to 18 months. The menstrual cycle occupies four to five days and is signalized by shivering when she is stroked. The gestation period is 21 to 23 days. The normal life span of both male and female albinos is regarded as three years. This is assumed to be equal to about 90 years in human life span.

Even well-cared-for laboratory rats are prone to a number of diseases: Pneumonia, indicated by "unnatural, noisy, labored, and quickened breathing"; middle ear disease, the symptoms of which are tilting the head to one side with the nose down to the floor, staggering and lack of coordination; paratyphoid, evidenced by anemia, chocolate brown instead of bright pink eyes, rough dull coat, diarrhea, and crusts around the nostrils; ringtail in newborn rats, characterized by swollen tails and sometimes blackened toes; faulty dentition, commonly due to elongated incisors which should be clipped with bone cutters.

Fleas, lice, bedbugs and mites are common blood-sucking ectoparasites of rats. Of the endoparasites, the Cestoda is the most common. Small, ivory-white cysts on the liver are an indication of *Cystercersus fasiolarus.* Roundworms and thorn-headed worms also are found in albino rats. Several protozoa occur in the intestinal tract and Bartonella invade the blood stream.

Swiss White Mice

The chapter on mice is by Leonell C. Strong, Yale University School of Medicine. The author relates much interesting material about mice; 18 pages of it, but the most astounding deals with the remarkable fecundity of these small animals, which weigh but an ounce when fully grown. They breed at the third or fourth month of life and thereafter produce litters numbering up to a dozen or more, practically every month. The female will mate and conceive within 24 hours after the birth of a litter.

As is the case in albino rats, Swiss white mice have been inbred closely for a great many generations, but contrary to the result in the rat and guinea pig, this inbreeding, in the opinion of the author, has reduced the vigor of the animals. On this account both the temperature (72 to 74 F.) and the humidity of their environment should be controlled and all contact with other animals prevented to avoid loss, sometimes of a whole colony overnight.

Of the diseases to which mouse colonies are subject, salmonellosis is the most serious. External parasites are common and constitute a difficult problem since most insecticides are scarcely less toxic for the host than for the parasite. However, derris root powder with an equal quantity of talcum powder is tolerated by mice, if not used in sufficient quantity to create a dust hazard. The talcum powder should be sterilized, otherwise it may carry harmful bacteria to these delicate creatures.

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Treatment of Cancer

A preliminary report (*Am. Jour. of Roentgenology,* 74:123, 1956) from the Cancer Clinic of George Washington University indicates that among 39 patients affected with advanced or "hopeless" carcinoma, the condition in 32 improved following the parenteral administration of buffered aureomycin hydrochloride, followed by *x*-ray treatment and possibly some surgery later. Previous conditions of these patients were beyond the usual surgical and/or *x*-ray treatment period. In culture at least, aureomycin retards cell division, and it is hypothesized that this antibiotic also sensitizes the cells to gamma rays. Nine of the 32 improved cases were still without evidence of cancer 19 months after the aureomycin-*x*-ray therapy.

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A.A.H.A.
Annual Meeting
Miami Beach May 23-26, 1956

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*Published by John Wiley & Sons, Inc., New York, N. Y. Price — $8.

The Necessity And Importance Of Ethics In My Profession

JOHN G. HARE, Ontario Veterinary College, Guelph, Ontario, Canada

Veterinary students were encouraged to consider matters of ethics when they were invited in 1945 to compete for a valuable prize by writing an essay on the subject. Since that date, the American Animal Hospital Association has carried on the poject begun by Dr. Loyd C. Moss so that a series of students have won expense paid trips to the annual convention of the American Animal Hospital Association.

This year's grand prize winner was Mr. John G. Hare, Ontario Veterinary College, class of 1956. Mr. Hare read his paper at the opening session of the Detroit meeting of the A. A. H. A., May 5, 1955.

ANY discussion of the importance of ethics must include first a clarification of that rather broad term. Various definitions are given; "the science of moral duties", "the science of ideal human character", "conforming to professional standards of conduct", "of or relating to moral action, motive, or character".

Through all these phrases in which the lexicographer delights, there runs one strong thread of unity, the idea of morals. When we begin considering morals and morality, we find ourselves departing from the regarding of ethics as a traditional solid, *modus operandi* which can be followed or evaded as the situation warrants, and recognizing ethics as a more intangible code of behavior into which the individual must pour his self respect, his belief in human dignity, and, most important, his conscience. If ethics are the face of a profession, then the blood which nourishes that face is found in the consciences of that profession's members.

Although the term 'ethics' is generally restricted to the professional world, it has counterparts in every aspect of society. Every day we see merchants, farmers, and laborers called upon to make decisions in which their code of honesty and their conscience are influencing factors. Ethics are not confined to any group. We all are confronted continually with minor crises through which our set of standards guides us. However, nowhere is it as important to have this set of standards of the best quality, as in the professional world. The reason for this should be apparent. The professional man has developed, over a great period, a place in society in which his influence on the lives, the thoughts, and the health of his fellow citizens is perhaps greater than that of any other group. The healer—the medical man, and more recently the veterinarian, do exert this influence and so should strive for standards which justify it.

Acquiring a degree and the qualification to practice a profession should not be regarded as a right, but rather as a privilege. Men and women who have reached professional status must realize that their education and the wisdom it has given to their hands, are in trust only, and that trust must be repaid in service. Only in conscientious effort, to the best of our abilities can we justify that trust, especially to those who suffer and whose mouths are dumb.

Therefore professional status should bring not selfish prestige, but responsibility, and the realization of that service we owe to those who can not heal, and to those that suffer. Perhaps one could say that ethics govern and typify the acceptance of that responsibility. Ethics call on the bearer to keep always in mind his duty, his self respect, and his conscience, in fulfilling the life he has chosen.

In veterinary medicine, the first duty of the graduate is toward his immediate patient, the animal. Often factors of convenience, economy and human relationships obscure this, but it never should be forgotten. The body is broken, you are the healer. That is the essence of your life, and anything which would destroy that essence is false.

One's acceptance of that fact, and of one's moral obligation to heed it, is intricately woven with one's ethics, with that part of one's conscience which demands the relief of suffering.

Ethics in relation to your colleagues are

greatly important also, and often apparently more so than to the patient. A stating of the various responsibilities of one professional man toward another is not the purpose of this discussion. Rather let us say that your moral principles should dictate honesty, kindness, tolerance, and loyalty, and that therein the demands of ethics will be met. The importance of ethics here, lies in the fact that mutual respect and ethical relationships with one's colleagues will create not a mere union of strength in numbers, but a smooth working fellowship which will inspire the confidence of those outside the profession, and the pride of those within. It would be misleading to think of the parable of the bundle of sticks, leave that for the labor unions. Rather let us think of ethical treatment of colleagues as a mutual pride in performing a difficult job well, in cooperation and harmony.

The applying of our code of ethics to our relations with our clients calls on us once more to let what we believe to be fair and right guide our course. The actual items of ethical and unethical conduct are superficially almost innumerable, but can be considered together in relation to that responsibility we assumed when we were given the privilege of education. The veterinarian is carrying, in his mind and in his skills, that trust, and only by service to the best of his ability, by integrity, and by devotion to duty, can he avoid betraying that trust. As a professional man, he has given up the life of set hours, set wages, and no responsibility, for a life in which rendering his services to help others should be his foremost principle.

Ethics do have a definite necessity and importance in the veterinary profession from a strictly practical aspect, also. Practitioners of law, theologians, and medical men, are well settled in positions of respect in society, but the veterinarian is still a comparative embryo as a truly professional man. We may hate to admit this fact, and it is all too easy to dismiss it in the light of rapid progress in veterinary science, and the glitter of instruments, gowns, and masks, in a spotless small animal surgery, but it is there.

Few laymen have any doubts about the adequacy of their medical practitioners, and realize that the latter have spent a considerable number of years in medical school, but far too many of the same laymen think of the "vet" as having spent a year or two at the "Agricultural School". This attitude toward the veterinary profession is becoming less prevalent but is still a major factor to consider. The use of a code of ethics by veterinarians will accomplish a great deal in elevating the profession in the eyes of the public, and hastening the mental divorce of the veterinarian from the livery stable atmosphere in which far too many laymen regard him.

Mr. John G. Hare

However, while this somewhat harsh view expresses one of the concrete needs for conforming to professional standards of conduct, it should be considered in a secondary light to that need of the individual to preserve his own personal respect, his dignity, and his knowledge that he is maintaining the trust his professional status has given him. At the final summing up, that will be his greatest satisfaction. "To thine own self be true, and it follows as the night the day, thou canst not then be false to any man."

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Public Health Aspects of Brucellosis

Brucellosis and its spread to man continues to be a very important problem. Records kept in Iowa seems to indicate, among other things: (1) That male farm workers are most likely to contract brucellosis during sow farrowing season of the year; (2) there were increased numbers of human infections in the group having animal contacts, and less in those consuming unpasteurized dairy products; (3) the seasonal onset was greater in males than in females. Though the report does not in any manner minimize the great values of pasteurization of dairy products, at the same time it emphasizes that only by eradication of animal brucellosis can human brucellosis be prevented.

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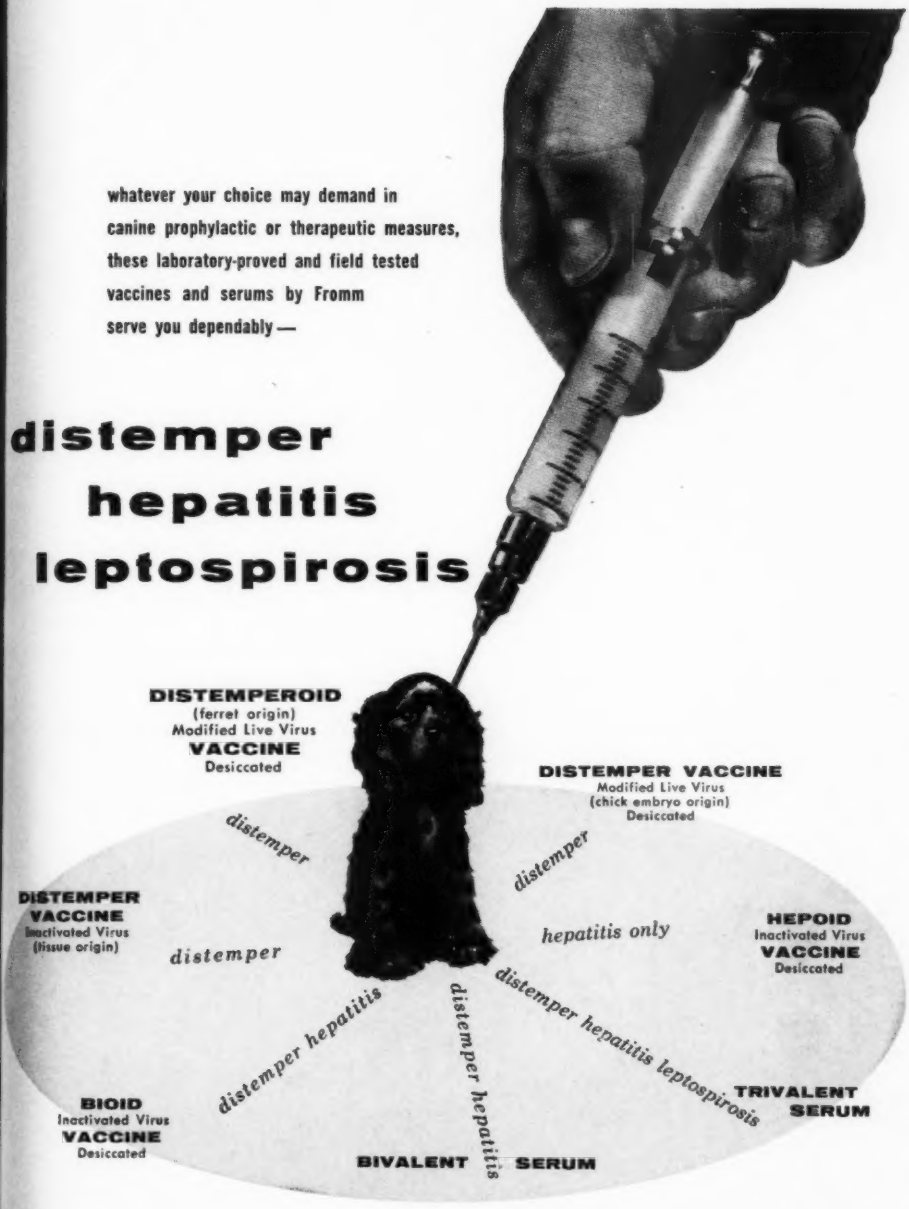

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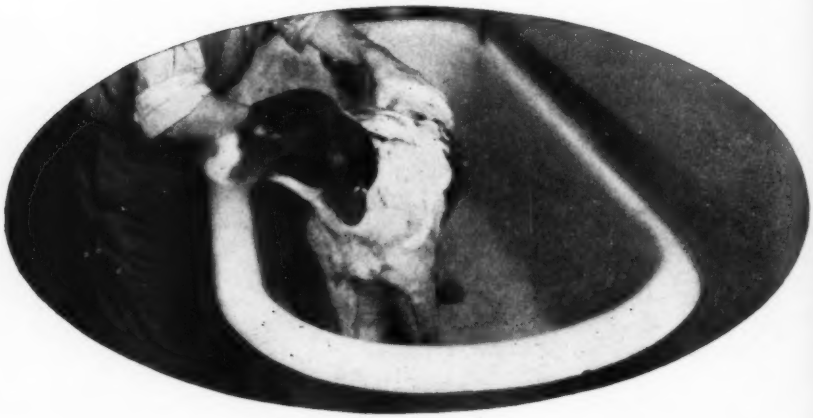

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Veterinary Medicine In India

E. E. LEASURE,* D.V.M., Manhattan, Kansas

FOR a period of approximately three months last summer, it was my good fortune to have been assigned on a mission to India as a member of a three-man team for the International Cooperative Administration (formerly F.O.A.) of the United States government.

We left New York City via air Wednesday afternoon, July 19, and after stops at London, Paris, Geneva, Cairo, and Bombay, arrived in New Delhi approximately 10,800 air miles away on Saturday, July 22. The trip was uneventful except for the inability to land at Geneva due to heavy rain over the airport which forced return to Paris for an overnight stop.

Travel in India for approximately 10,000 miles was principally by air. However, some trips were made by rail and car. Our program of operation in India had been outlined previously by the Indian government officials on a seven-day-a-week basis. Our activities necessitated both day and night travel on occasions and provided visits to all of the principal states with the exception of Assam. The country from the air, with the small farm plots, forests, and jungles was indeed a beautiful sight and one that shall long be remembered. The monsoon season was prevailing. However, we encountered few heavy rains and storms. Rainfall was unusually heavy in certain areas of India and, as a consequence, the country experienced considerable flooding of a rather unusual nature in these specific areas.

India, with a total area of approximately one-half the size of the United States has 85,000,000 acres of land under irrigation and plans are going forward rapidly to double the amount. Agricultural methods, while primitive in comparison to this country, are nevertheless quite variable. Having a climate that varies from tropic to temperate, many varieties of fruit are available.

India, like this country since World War II, has experienced a great growth in population in its cities. Cities are far more developed along modern lines than are the rural areas. Many now have a good water supply, sewage, modern apartments, homes, and modern public buildings.

The assignment charged the three-man American team, consisting of Dr. Albert H. Moseman, Director of Crops Research, United States Department of Agriculture, ARS Washington, D.C.; Dr. Robert E. Buchanan, Dean Emeritus of Iowa State College; and myself, with conducting an agricultural research and educational survey of all of India at the national government and state government levels. The term "agriculture" was used in the broad sense to include plants, animals, veterinary medicine, home science, and agricultural engineering.

The American team in reality was the counterpart of an Indian team of five members that had visited the United States last January and February to survey the agriculture, research, and educational program as administered in our land-grant college institutions. One member of the Indian team accompanied the American team over the greater part of India in making its survey. The five members of the Indian team participated in drawing up the final report and recommendations of this Indo-American team.

The principal industry in India is agriculture, therefore the economy is primarily dependent upon a sound agricultural program. Being aware of this fact the Indian government requested the United States government, through the auspices of the International Cooperative Administration, to conduct such a survey with the ultimate goal of improving the country's agricultural research, and educational program.

Because of the large area of India covered and the veterinary colleges surveyed, this mission afforded an excellent opportunity to observe the various fields of veterinary medicine as it exists today in India.

Colleges of Veterinary Science and Animal Husbandry

The first college of veterinary science in India was established at Poona, Bombay State,

*Dean, School of Veterinary Medicine, Kansas State College.

in 1886. After a few short years it was moved to Bombay. The second college was established in West Bengal at Calcutta in 1899 and the third at Madras in 1903. Additional colleges of veterinary science and animal husbandry were established as follows:

Lehore, West Pakistan (formerly of India).

Bihar College of Veterinary Science and Animal Husbandry, Patna, 1930.

Osmania University Veterinary College, Hyderabad, 1946.

Utter Pradesh College of Veterinary Science and Animal Husbandry, Mathura, 1947.

Punjab College of Veterinary Science and Animal Husbandry, Hissar, 1948.

Madhya Pradesh College of Veterinary Science and Animal Husbandry, Jubbalpur, 1948.

Assam College of Veterinary Science and Animal Husbandry, Gauhati, 1948.

Rajasthan College of Veterinary Science and Animal Husbandry, Bikaner, 1954.

In 1955, the establishment of four new colleges was authorized for the state of Madyha Bharat, Orissa, Andhra, and Travancore-Cochin. During my visit these colleges were in the process of organizing and their exact locations had not been decided definitely.

With few exceptions the veterinary colleges of India were established as separate entities and not in conjunction with universities or agricultural colleges. In many respects this has proven to be a decided disadvantage. India hopes to establish its new colleges of veterinary science and animal husbandry with the agricultural colleges.

Veterinary education in India, as in this country, has undergone many transitions and particularly since freedom in 1947. The nation is now in the process of concluding its first five-year developmental program and is feverishly planning for the next five-year program.

Since India has been engaged in a colossal undertaking of extending agricultural extension methods to 550,000 agricultural villages, she suddenly became aware that the 2,400 plus veterinarians were far too few for the number required in this multipurpose agricultural extension program. Consequently, the number of colleges has been increased rapidly and the number of students considerably augmented.

Organization

As stated above, for the most part veterinary colleges were established as separate entities. Naturally, therefore, the departmental organization of necessity included such departments as Animal Husbandry, Poultry Science, Chemistry, et cetera, in addition to those departments common in this country. Some institutions of India were fortunate in that the states were able to provide large farms adjacent to the college for student training in animal husbandry, dairying, poultry husbandry, and crops. For many years the colleges offered three years of college level work, giving a diploma, in lieu of a degree, attesting to the fact that the individual had completed the college curriculum. It was not until 1936, that the first college of veterinary science became affiliated with a university system, increased the course requirements by one year, and graduated its students with a Bachelor of Veterinary Science degree, given through its affiliated university. Other colleges followed this precedent but it was not until after 1952 that all colleges became affiliated with a university and raised their requirements.

Apparently veterinary education in India, while under British mandate, was provided to train individuals to become expert stockmen proficient in the procedures of castration, vaccination, and treatment of simple wounds rather than provide a high standard of veterinary training. As a matter of fact, under this system veterinary positions of authority and

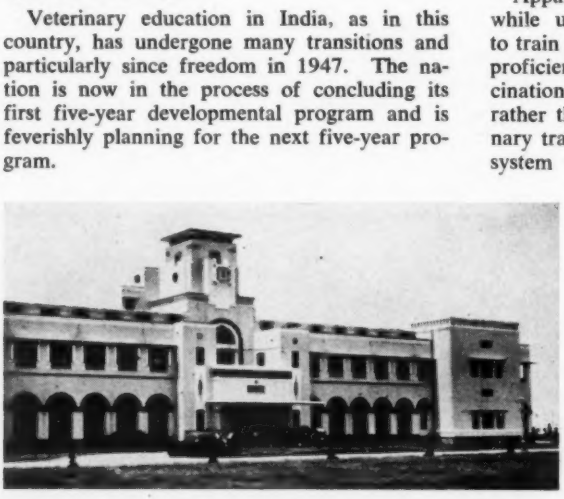

Fig. 1. Main building Uttar Pradesh College of Veterinary Science and Animal Husbandry, Mathura, India.

research for the most part were allocated to veterinarians who had obtained their training from the United Kingdom. Indian veterinarians were restricted by law from passing judgment on soundness, et cetera. By necessity the situation was reversed rapidly when India gained its freedom in 1947.

In comparison with our institutions, the commonwealth university system of education as followed in India operates in the following manner: The student completing his elementary and high school education in India, consisting of 11 years for the most part, is examined by the university, the examination being called the Matriculation Examination. If satisfactorily passed the student has qualified for college. If wishing to enter a College of Veterinary Science and Animal Husbandry, it then becomes necessary for him to complete two years of college work in science with biology as an option. Upon completion of the two years the student is given an intermediate science examination. Those successfully qualifying on this intermediate science examination are then eligible for admission to a College of Veterinary Science and Animal Husbandry.

Since the colleges are now all affiliated with universities they must comply with university requirements. For example, the Board of Directors of the universities formulates the curriculum, the syllabus of each course, and provides examiners of students. While the principal of the college and one or more heads of the departments may be members of the university Board of Directors, the university nevertheless controls the curriculum, the syllabi, and examination.

Depending upon the university affiliation, students may be examined by the university examiners upon the completion of the first year of college work or first two years of college work and upon the end of the third or fourth year of work in the College of Veterinary Science. This means that in some institutions students are examined at the end of each year or at two year intervals. Failure in any one examination may lead to expulsion or repeating the entire previous year's work. It was evident that a great deal of dissatisfaction with the system exists.

From the above it is quite apparent that veterinary education in India since 1952 consists of two years of pre-professional college training plus four years of professional training in veterinary medicine following the completion of approximately 11 years of elementary and high school education. Upon successfully completing the university examination after four years of professional work the affiliated university grants the degree Bachelor of Veterinary Science and Animal Husbandry (B.V.Sc. and A.H.).

The faculty organization is similar to that of veterinary colleges in America but in general the nomenclature is different and there is a wider span between ranks. With few exceptions each college of veterinary science and animal husbandry is headed by a principal whose title corresponds to a deanship. Each department, such as anatomy, physiology, et cetera, usually is headed by an individual whose title is professor. Additional personnel of the departments hold titles of lecturers or demonstrators. The number of faculty personnel in the colleges ranges from a total of eight to 44; number of students enrolled on the average is above 350.

Buildings and facilities, as would be expected of a group of new and old colleges, vary considerably. It was apparent that the officials concerned with veterinary and animal husbandry education were cognizant of the need for additional physical facilities and equipment. It was also apparent that new equipment has been provided and is forthcoming. In general, buildings, equipment, and faculty were inadequate to handle the large enrollment.

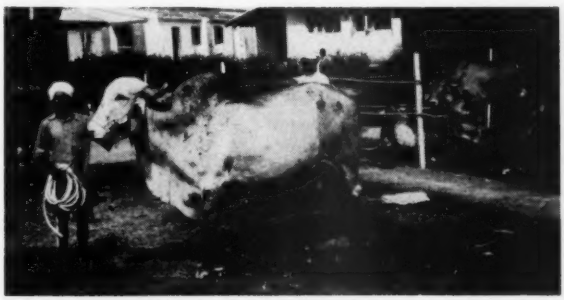

Fig. 2. Gir bull, Bangalore, India.

Advanced or Graduate Training

Advanced courses or graduate training leading to the degree Master of Science or Ph.D. had been instituted in two of the colleges. Although its importance was recognized by the school administration, it had been difficult to institute such training because of precedence and lack of sufficiently trained faculty personnel to man the program.

The Indian Veterinary Research Institute at Izatnagar has been granting the Master of Science, Ph.D., and Doctor of Science degrees for several years through its university affiliation. The program of work leading to these degrees did not include formal course work but was based entirely upon research and the attainment of a well-grounded knowledge in the specific field, the affiliated university conducting the final examination and awarding the degree. Graduate training is offered in this institute in the fields of bacteriology, pathology, physiology, genetics, animal husbandry, and nutrition. It was gratifying to note that central government officials had recognized the importance of graduate training in the institute and was also in the process of formulating plans for the setting-up of a formal postgraduate school leading to advanced degrees, and in addition to research, would offer formal course work. The plan calls for the establishment of a graduate faculty, additional buildings, and facilities sufficient to handle ten postgraduate students per year in each of six fields. After the first year the school would have an enrollment of 120 students seeking advanced degrees in veterinary science and animal husbandry.

Research

Organized scientific research into the problems of livestock conservation and development in India may be said to have started in 1889 at Poona, Bombay State. It was in this year that the Bombay government laid the cornerstone of the building to house the Imperial Bacteriological Laboratory, later to become known as the Indian Veterinary Research Institute and to be relocated at Mukteswar in the Kuamaun hills in 1893. In 1915, a branch laboratory was established at Izatnagar and this has since become the principal station. With the establishment of the Indian Veterinary Research Institute animal disease investigation into the many problems of India's livestock got underway and has continued since. This institution also became active in the development and production of animal biologics and for many years supplied the entire needs of the country. Since freedom in 1947, most of the larger states of India have established research and biological production laboratories. These for the most part are not affiliated with the colleges but likewise exist as separate entities.

The accomplishments of the Indian Veterinary Research Institute have been many and are responsible for the satisfactory conclusion of many serious disease outbreaks in Indian livestock. Through its activities in research, biological production and the dissemination of information. The Institute also has provided its services and biologics to surrounding countries in their program of animal disease control.

Animal disease research in the colleges of veterinary science is of recent origin and along modest lines.

Livestock Problems

The livestock disease problems are so immense that they can not be visualized readily by casual examination. India has the second largest cattle population in the world. Its cattle and water buffalo number something over 200,000,000. Sheep, goats, and poultry are also of great magnitude. It is also said that

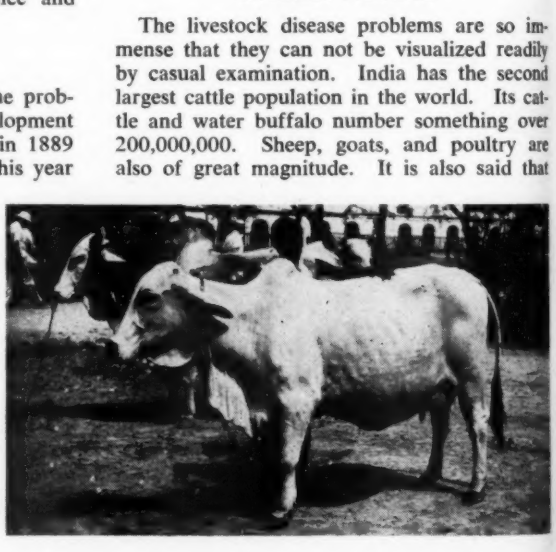

Fig. 3. Sindhi cow, best of breed, Karnal, India.

India is the third largest milk producing nation in the world but even so less than one-fourth pint of milk per capita per day is produced.

It has been an unfortunate consequence that during the last one hundred or more years the quality of the livestock of India has been steadily on the decrease, to the point where its animals, for the most part, are considered to be of nondescript breeds and types. While there are many types of Zebu cattle, the Indian scientists state that they probably could be reduced to 25 specific breeds.

Rinderpest, anthrax, blackleg, piroplasmosis, hoof-and-mouth disease, hemorrhagic septicemia, parasitic diseases, and nutritional disease take a large toll of the cattle population each year. Other diseases such as surra, lymphangitis, ranikhat, nasal granuloma, equine encephalomyelitis, hepatic cirrhosis, contagious ecthyma of goats, bovine endemic hematuria, theileriasis, and many others have taken their toll of horses, cattle, poultry, sheep, and goats.

Biological agents, while having been produced and used for years in the control of animal diseases in India, have been of insufficient quantity and quality to handle adequately the numerous emergencies. Transportation and climatic difficulties also have created problems in the successful use of biologics. The latter difficulty is being overcome rapidly by the establishment of numerous state biological laboratories and the introduction of modern standardization procedures in biological production and refrigeration.

India is presently engaged in a scheme to eradicate rinderpest by mass vaccination. According to reports, the disease has been eliminated in south India and immunization through vaccination is being carried on from east to west, northward throughout the country as rapidly as possible.

Many other animal and poultry diseases of considerable importance to the livestock and poultry industry could be mentioned, but space precludes their discussion.

Veterinary Services

Less than ten of the 2,400 plus veterinarians in India are private practitioners. Therefore, all of the graduates of the colleges look to the government for employment.

As stated previously, India's numerous farm villages have been divided into districts. It is the plan of the several states to supply to each of these districts a district veterinary hospital and dispensary to which villagers may take their animals for treatment or artificial insemination and from which veterinary service can be supplied to the field. These veterinary hospitals and dispensaries also are to supply diagnostic services but major problems of diagnosis are handled in state diagnostic laboratories or in the central institute. Veterinary services are furnished free to the livestock and poultry owners.

We were informed that approximately 70% of the people of India were non-vegetarians and therefore would eat mutton, poultry, and fish and, of these, roughly one-third would eat the meat of beef.

The slaughter of cattle in most states was regulated by law. However, animals declared unfit for breeding, milk production, or work by a veterinarian could proceed to slaughter. In those cities having slaughter plants the government supplies a veterinary meat inspection service. Refrigeration facilities are not well developed and consequently fresh meat products usually are consumed within 24 to 36 hours after processing.

Comments

The writer of this article has attempted to set down brief, unbiased facts without criticism. Most naturally a great amount of detail and discussion have been omitted.

The Indian veterinarians were found to be of high caliber, speaking both English and their native tongue. They were courteous, sincere, straight forward, and intensely interested in new veterinary information and procedures. All appear to have a keen desire to improve veterinary and animal husbandry education in order to provide better service to the livestock and poultry industry. Young veterinarians were especially desirous of continuing their education through postgraduate training.

India hopes, through its next five-year program, to supply adequate veterinary and animal husbandry service to each village of India. The task is a tremendous one but ultimately a better, healthier livestock, and poultry industry should result.

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"America is being bountifully fed by the less than 10% of our population who are full-time farmers. Perhaps we will soon reach the point where only 5% of our people can raise our food. In Russia the proportion of manpower needed on the land more nearly approaches 50%."—*Paul C. Johnson in Prairie Farmer.*

Use of Pancreatic Dornase in Infectious Bovine Rhinotracheitis

E. H. SCHEEL, D.V.M., Greeley, Colorado

In this practice the enzyme, pancreatic dornase,* has been used as an aid in treating infectious rhinotracheitis of cattle. The results obtained so far appear to be promising.

A brief review of the symptomatology and pathology of the disease is given to point out the value of this enzyme in the treatment of this disease.

Clinically affected animals exhibit in early, acute cases, excessive salivation, temperatures of 104 to 108 F., and a dyspnea which usually is accompanied by a wheeze or roar. There is severe hyperemia of the nasal mucosa and frequently, pustules are visible[1]. The nasal discharge may vary from serous to mucopurulent. As the disease progresses the mucous membranes of the upper respiratory tract become congested and mucopurulent exudates fill the nasal cavity. If these changes are restricted to the anterior portions of the respiratory tract a favorable prognosis is given. When the pathology extends into the sinuses and farther down the trachea and bronchi, pneumonia results[2]. The exudates and necrotic debris adhere to the trachea, greatly reducing the size of the lumen. In these cases an unfavorable prognosis must be given. Death, or at best, a chronic condition is the end result.

The early cases respond well to treatment. Initially the animal is treated with one of the broad spectrum antibiotics, expectorants, and antihistamines. Subsequent treatment may consist of sulfonamide and penicillin-dihydrostreptomycin combinations[3].

The more advanced cases, relapsed cases, and those animals not responding to the above therapy create a more difficult problem. In addition to the sulfonamides and antibiotics, supportive therapy is indicated, which must be directed toward the removal of the necrotic debris and exudates lining the trachea, larynx, and pharynx.

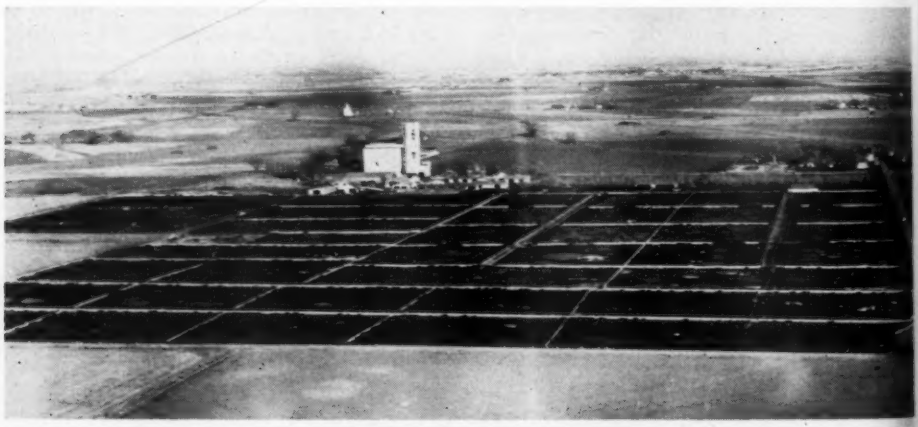
Since satisfactory results in removing necrotic tissue with pancreatic dornase had been obtained in other conditions it was decided to attempt its use in these problem cases of rhinotracheitis.

Method of Use

The method used in this practice is to dissolve 100,000 units of dornavac® in 10 cc. of diluent and add 10 cc. of a penicillin-dihydrostreptomycin combination and 20 cc. of water or 50% glucose. The 50% glucose is preferred because it lends a sticky quality to the mixture. This preparation is then injected directly into the trachea by means of a 40 cc. syringe and a 16-gauge 2½ in. hypodermic needle which has been inserted between tracheal rings 5 or 6 in. posterior to the pharynx. Results are in proportion to the spray or nebulizing effect that can be obtained from the injection.

*The author acknowledges with thanks to Dr. F. F. Scheidy, Sharp & Dohme, Division of Merck & Co., for supply of pancreatic dornase (dornovac) ® used in this field study.

®Sharp & Dohme, Philadelphia, Pa.



Air view of the Monfort Feed Lots, Greeley, Colorado, where approximately 20,000 head of cattle are being fed continuously preparatory to marketing.

Fig. 1. Infectious bovine rhinotracheitis illustrating profuse, purulent, nasal discharge in an advanced case. Exudates extend throughout the upper respiratory tract and into the trachea.

Injection of this prepartion into the trachea will loosen the exudates and debris enabling the animal to cough up much of this material. Although one treatment is sufficient in most cases, the procedure may be repeated several times at 24- to 48-hour intervals if necessary.

This same preparation can be used to spray directly into the nasal cavity to aid in the removal of the nasal discharge which is adhered to the turbinates. It also can be sprayed into the pharynx by attaching an insemination pipette to the syringe and passing the pipette through a Frick speculum placed in the mouth.

The enzyme, dornovac, has proven to be a satisfactory aid in the treatment of infectious rhinotracheitis of cattle. It is hoped that by this brief report others may benefit from its use.

REFERENCES

1. Palotay, J. L., Infectious Necrotic Rhinitis and Tracheitis. *N. Am. Vet.*, 36:102, 1955.
2. ....., Infectious Rhinotracheitis of Cattle. *Vet. Med.*, 51:6, 1956.
3. Miller, N. J., Infectious Necrotic Rhinotracheitis. *Jour Am. Vet. Med. Assn.*, 126:463, 1955.

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For treatment of listeriosis in cattle, we have found rather successful 1 to 2 gm. terramycin per 1000-lb. cow injected intravenously with dextrose solution.—*H. P. Jensen, D.V.M.*

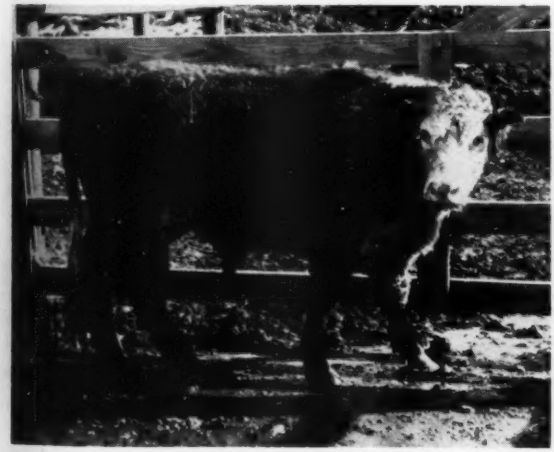

Fig. 2. Patient after treatment with pancreatic dornase. Note clean appearance of the nose. Loosened and liquefied exudate is not expectorated and, although some is forced out of the nares, most is swallowed. This animal was turned back to the lots after picture was made.

EDITORIAL COMMENTS

Promote Pork Sales

The American Meat Institute, comprising companies now doing approximately 85% of the commercial meat processing done in the United States has taken two major steps for promoting pork sales. These may be expected to be reflected in the price paid producers of swine.

Step 1 is the recommendation for closer fat trim of pork cuts to no more than 1/4 in. thickness. This is considered sufficient, with good marbling, to maintain nutritiousness of the meat. The industry thus is attempting to eliminate the waste fat removed in the kitchen.

Step 2 is the budget increase for promotion of pork by radio and television advertising and magazine display.

The decision to trim cuts freer of fat was made after investigators studied reactions to displays placed side by side in self-service meat counters. Lean cuts outsold those not close trimmed at a premium of 10c per pound.

These efforts will stimulate consumer demand and sales promptly and will hopefully relieve present glut. Effort of growers over the eight to ten-year period past to produce meat type market hogs has so far resulted in an offering amounting to 15% of the total runs of market swine. The proportion, however, is growing slowly.

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Man-Made Furs and Gems

Substantiating the truth in the statement that nothing exists in nature but that can be reproduced or synthesized by chemistry is the recent announcement of man-made furs in *Life* magazine. Depicted were garments of natural and man-made furs scarcely distinguishable from one another. Costs were most extreme opposites. Perhaps the furs worn by milady can be identified promptly by those well informed on differentiating characteristics which would be unfamiliar to most persons.

Production of gems, too, is a technological achievement of merit. Diamonds and garnets indistinguishable from natural gems may be produced by means of application of high temperatures and pressures to basic material elements.

We only can speculate as to the influence of these perfected scientific achievements on the industry now supplying the natural products such as mink pelts and mined diamonds, but we would expect it to be significant.

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Prescription for Treatment of Disease a Responsibility

Off-the-cuff diagnosis of diseases with a resulting sale of medicated feed is a responsibility for which feed men ought not to ask.

That is the feeling of practicing veterinarians, Dr. Morris Erdheim, department editor for VETERINARY MEDICINE and director of technical development for Dawe's Laboratories, Inc., Chicago, told feed dealers and manufacturers at the 11th annual Kansas formula feed conference, held at Kansas State College, Manhattan, January 9, 1956.

In prepared remarks, Doctor Erdheim said veterinarians resent sales of high level antibiotic feeds and packaged medicinals by feed men for treatment of specific disease conditions. The veterinarians feel, he said, that treatment can not justifiably be recommended before an accurate diagnosis is made by a professionally trained person.

It is true that in enough instances the use of high-level antibiotic feeds on a shotgun basis may be helpful, Doctor Erdheim said, but too many problems develop following its use for the feed man to ignore.

A veterinarian who is familiar with the line of medicated feeds in the dealer's warehouse can, if he has been properly courted, use these feeds on a prescription basis. This arrangement puts everything into proper focus.

Doctor Erdheim pointed out that feed dealers can render real service to their customers with suggestions for improving management practices. This is a neglected field, since most farmers know far more than they practice in terms of management and sanitation. Even the best of feeds will show up at a disadvantage when fed to animals on poorly managed farms.

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Intrinsic Value of Insurance

Insurance protection, like merchandise, has built-in intrinsic value proportionate to the integrity of the manufacturer or underwriter. Two pieces of goods having equal dollar value may look very much alike to the casual examiner, whereas one piece may excel the other in the service for which it is designed.

Insurance furnishes a special example of *value for cost* because of the requirements for expression of contract terms. These need to be of such standards that interpretation is clear fundamentally and universally, and in consideration of accident and sickness disabilities that study indicates occur with a definite regularity. The deviation from the simple "I. O.U. if—" is designed to protect both insured and underwriter.

Veterinarians in the United States have been offered group health and accident insurance on a premium level with less hazardous occupation only since the first 100 policies were issued Illinois practitioners ten years ago. These insured subscribed to an insurance plan, the Silent Partner Plan, and were issued policies so designed as to give maximum coverage for minimum cost. The demand to share in the plan has grown so that today veterinarians who are members of 44 separate state associations have available carefully considered and specially designed insurance protection without regard to past medical history so long as the required enrollment participation in each state is met. In other states insurance is available only to those who qualify.

Of real advantage is the correlation of this insurance plan with the official state professional group. Insurance committees in participating states are maintained primarily for the advantage of the insured members. Their duties have no concern with issuing detail except to confirm the applicant's organization affiliation. There is comfort in the assurance that surviving colleagues will have the interest of beneficiaries to consider in the possible event of challenged claim.

The Continental Casualty Company, underwriters of the plan as first conceived have since made five progressive changes that have influenced benefits and premium cost. Each of these meant more benefits for less than would have been possible without the controlled study and analysis of Broker Peter Jans who has devoted his entire efforts during these past ten years toward perfection of secured protection for veterinarians. Now, in addition to the Silent Partner Plan, the D.V.M. Plan is added to keep pace with ever increasing costs of medical treatment and care.

Your examination of these insurance offers has been invited. Comparison with others is urged. The favorable experience and the integrity of the underwriters has been reassuring. Complete information is available from Silent Partner Associates, Veterinary Department, P.O. Box 824, Evanston, Illinois.

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Pet Health Plan Operations Close

Ambitious plans of a group of promoters in the Los Angeles, California area, launched over a year ago are reported to have been abandoned. Construction on a new 500-cage animal hospital, undertaken last fall, has been stopped because of lack of public interest.

The Pet Health Plan, as originally conceived, was an insurance plan with health services provided prepaid. The Plan failed to receive endorsement of organized veterinary groups. An extensive advertising campaign employing newspaper, radio, television, media, and personal contacts also failed to gain sufficient support to assure success of the venture.

This probably was the most extensive and discussed insurance plan for pets thus far attempted in the United States. None has proved financially successful.

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No Chance of Buying Reactors at Billings

As each lot of cattle enters the ring of the Livestock Commission Yards at Billings, Montana, a neon sign flashes "Tested"—"Vaccinated"—"Not Tested" or "Unknown." Buyers can thereafter bid on the basis of information provided.

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Legality of Ohio Clinic Challenged

The Cleveland (Ohio) Academy of Medicine injunction suit against the Hopkins Clinic filed over a year ago has been postponed, according to *Medical News.*

The issue centers on whether hospitals have the right to employ physicians on a salary basis and bill for such professional service. Attorneys for the Academy contend that such practice is illegal. Principle of this issue may also be applied to veterinary practice.

VETERINARY NUTRITION

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

Prevention of Milk Fever

Milk fever always has been associated with some dramatic aspect. Before successful treatments were found, animals would develop the condition suddenly, and die after a brief illness. Then someone discovered that a bicycle tire pump could bring about a complete cure by pumping up the four quarters with air and ligating the teats. Of course, with the advent of intravenous calcium, the picture became truly dramatic. An injection into the jugular vein of a paralyzed cow, in a comatose condition, would have her on her feet, bright and alert, within 15 minutes.

Now this dramatic note has shifted to new methods for prevention of milk fever; and dramatic, indeed, they are. One involves the use of 5,000 to 6,000 times the normal daily intake of vitamin D to be fed every day. The second deals with deranging the calcium-phosphorus ratio of the cow's feed. The third uses dihydrocholesterol, given orally or intramuscularly.

Feeding Massive Doses of Vitamin D

Hibbs and Pounden, at the Ohio State Experiment Station, pioneered this method of milk fever prevention. They found that by feeding 30,000,000 units of vitamin D daily prepartum to cows which were prone to milk fever, incidence of this anomaly dropped significantly. They concluded that the technic actually prevented development of symptoms. As these high levels were reduced, the degree of prevention was reduced. When 5,000,000 units were fed daily, more cases developed than when 10,000,000 units were fed daily. More cases of milk fever developed among cases fed 10,000,000 units than those receiving 30,000,000 units.

The action of vitamin D in preventing this metabolic disorder is not well understood. It does not appear to be due to parathyroid stimulation. Nor does it seem to be related to a diminution of the milk flow. The increase in blood calcium may be due to lowered intestinal excretion or increased intestinal absorption. There also may be some way of facilitating the drawing of calcium from skeletal reserves.

Following is an outline of the use of high vitamin feeding in the field under practical conditions:

1. Treatment should be considered for use in herds with a high incidence of milk fever, and for cows with a history of previous attacks. It is not practical to include first calf heifers for treatment.

2. Use a concentrated source of vitamin D. With a concentrated source of vitamin D, less is needed to be mixed in the daily ration. This minimizes palatability problems.

3. Feed 15,000,000 units twice a day — stirred into the feed.

4. Treatment should be started five days before parturition. If the cow calves within the five-day period, discontinue the treatment the day after parturition. If she doesn't calve within five days, continue the treatment for an additional two days. Treatment should not be extended for over seven days.

If the vitamin D is fed over an extended period (three to four weeks), calcification may develop in the heart and larger blood vessels. These may show up clinically with abnormal cardiac sounds.

However, when the program is followed according to the outline described above, it is safe and effective.

Low Calcium-High Phosphorus Diet

Boda and Cole of the University of California developed this method. With it, they aim at causing a hypertrophy of the parathyroids so that at parturition the serum calcium will be kept at a normal level.

Factors which raise blood calcium inhibit the parathyroids. Therefore, a low calcium-high phosphorus ration would stimulate the parathyroids if fed for a month before parturition.

The California experimental work used a ration with a calcium-phosphorus ratio 1:3 which seemed to be effective in preventing milk fever. Normally, rations contain approximately a 2:1 calcium-phosphorus ratio.

In the animals on the test ration, the serum calcium tended to be higher in postpartum cows. There was no diminution of milk flow or any other undesirable effects on subsequent lactations.

This method has been tried experimentally in the field with some success. However, there seems to be no interest indicating a widespread application to practical conditions.

Dihydrocholesterol

This product is an oil-soluble fraction obtained from the vitamin D manufacturing process. Its pharmacological action resembles that of parathyroid extract. It may be used intramuscularly or orally.

The use of this product for preventing milk fever was developed in England. The product on the market in Great Britain is "A.T.10" (Bayer). The dosage is 5 cc. for intramuscular use, and 10 cc. in arachis oil for oral use.

While these new approaches to the milk fever problem may not make our intravenous equipment obsolete, they do point the way to a new era in milk fever control.

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Lysine-Energy Relationship

Inference from rat-feeding experiment suggests that hogs fed supplemental lysine in high-energy feedlot rations may gain faster and reach market weights with less feed. The work with lysine was done by Dr. Hans Rosenberg and Dr. Rudolph Culik at Du Pont's Stine Laboratory in Newark, Delaware, and reported to the American Society for Animal Production during the recent meeting in Chicago.

A ration similar to the type ordinarily fed hogs in the feedlot was fed to rats. Increasing the calorie content and adding a pre-calculated amount of lysine made the rats gain faster on less feed per unit of gain.

Lysine, one of the amino acids, is an important building block of all animal protein and is likely to be critical in diets based mainly on cereal grains. Since it can not be synthesized in the animal body, it must be supplied in the diet in sufficient amounts. Many of the ingredients which go into hog feeds are low in lysine content so that hogs in feedlot operations may not obtain sufficient lysine in their feed.

Doctor Rosenberg reported that there is a direct ratio between the calorie content of a feed and the amount of lysine required for best performance. This makes it possible to calculate the lysine requirement in rat diets for various calorie levels. It is the first time that an energy relationship has been reported for an amino acid other than methionine, and in any diet other than poultry rations. A methionine-energy relationship in broiler rations was reported by Du Pont scientists last spring.

The lysine experiments with rats paralleled those already completed for methionine in poultry diets. A practical diet, complete in all nutrients including amino acids, was modified to change only the calorie content.

Each time the energy of the diet was increased, it was found that a corresponding increase in lysine was required. This proved true when the rats were fed an experimental diet based on bread crumbs and again when they were fed a practical type pig ration based on corn, cottonseed meal, and wheat flour middlings.

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Antibiotic Growth Stimulants for Dairy Calves

Based on observations and an extensive review Lassiter (*Jour. Dairy Sci.*, 38:1102 [Oct.], 1955) concludes that antibiotics stimulated the growth rates of calves from 10 to 30% during the first 16 weeks of age. There was little advantage to such supplementation after that and no beneficial effects are derived from feeding antibiotics to mature dairy cattle. The author also pointed out that certain of the available antibiotics appear to be more desirable than others, that the inclusion of these agents reduced the incidence of calf scours, increased feed consumption, feed efficiency, and overall condition and well being of the animal.

Inclusion of antibiotics in the rations of dairy calves appear to be justified by the beneficial effects derived as reduced calf mortality and lowered incidence of scours during early life. These benefits become insignificant in mature animals.

In an effort to postulate the beneficial action of antibiotics, two fundamental explanations have been presented. One refers to the possible stimulation of the pituitary gland and increased production of growth hormones. The other, that antibiotics possibly tend to increase growth of calves through an alteration in energy metabolism, probably involving rumen microflora.

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Estimates of the total cases of animal rabies in the United States for 1955 is 5,074; a drop of more than 1,500 compared with figures for 1954. Dramatic reduction of incidence of rabies in Texas contributed largely to this downward trend.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

DDT Poisoning in Chickens

DDT (dichlorodiphenyltrichlorethane) is reported to be poisonous to poultry when they range in confined areas in which the vegetation has been sprayed repeatedly with DDT, or when 50% DDT has been placed in the litter for insecticidal purposes. Affected fowl exhibit nervous symptoms as manifested by incoordination. Necropsy reveals some liver necrosis, and toxological examination shows a high concentration of DDT in the fatty tissues. The condition bears resemblance to epidemic tremors, and this latter should be considered in the differential diagnosis. If the birds are placed in DDT-free surroundings during the early stage of the intoxication, recovery is the rule.

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Rabies Control Must Cover Wildlife Reservoirs

There is a generally prevalent belief among those interested in wildlife conservation, and those engaged in domesticated animals disease prevention, that a means of control of rabies rests in keeping at minimum numbers such predatory animals as coyotes, foxes, and wolves. Whenever predators become abundant there is a corresponding increase in the number of cases of rabies among cattle, sheep, swine, and dogs, as well as in such wild animals as skunks, et cetera.

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Glycerine Recommended for Hypoglycemia in Sheep

Foreign publications continue to call attention to the value of glycerine as an agent to change the hypoglycemic condition in sheep (pregnancy disease of sheep) to a hyperglycemic state. At the rate of 3 cc. per kilogram of live weight (approximately 4 oz. for a 90-lb. ewe) given daily, orally appears to effect reversal of hypoglycemia to hyperglycemia. Glucose solution subcutaneously, in addition to the glycerine, also appears to be of aid in the reversal process.

Cooked Versus Raw Garbage

Cooked garbage as a feed for swine is in general as satisfactory as the uncooked. Weight gains as evidenced by dressed carcasses are about the same, and reproductivity apparently is not affected. Avitaminosis as a deficiency condition, particularly heat-labile A and C, does not cause trouble. No night blindness, scurvy, et cetera, have been noticed. In a measure this may be explained by the fact that the pigs are marketed at an early age before deficiencies are manifested. There has been some contention that the pork of animals fed cooked garbage does not set well but this has not been substantiated. One of the biggest problems is the expense entailed in the cooking process; one report mentions $0.80 per ton in 60-ton lots. Another problem, at least in those urban centers where housewives have during previous years been encouraged to wrap garbage in paper — old newspaper usually, the cooking process disintegrates the paper into pulpy material that the hog must consume with the garbage. Hogs root raw garbage out of the paper. Digestive upsets, constipation, lesser gains, and unthriftiness have resulted. There has been no solution for this "paper" problem; educational programs have been suggested. All in all the cooking of garbage has to a high degree attained its principal objective, *i.e.*, the control and practical elimination of vesicular exanthema.

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Zoonoses Threat to Health of Man

According to an article, Animal Diseases and Human Welfare (*Bulletin for Medical Research* 10:2 [Sept.-Oct.], 1955) there are at present at least 89 infections of domesticated and wild vertebrates recognized as transmissible potentially to man. These include bacterial, parasitic, fungoid, protozoan, and viral conditions. It is stated that many of these zoonoses remain undetected because of no readily accessible diagnostic services. Veterinarians are urged to make accurate reports so that complete data may be available to throw more light on the problem.

Ashe Lockhart
1891-1956

Dr. Ashe Lockhart, 65 years of age, founder and former president and general manager of Ashe Lockhart, Inc., died January 11, 1956 at the home at 610 West 57th Street Terrace, Kansas City, Missouri.

Dr. Ashe Lockhart

Born in Wadesboro, North Carolina, Doctor Lockhart attended Virginia Polytechnic Institute, graduating in 1911. He taught bacteriology and animal husbandry for one year before coming to teach at the Kansas City Veterinary College, where he studied veterinary medicine while serving on the faculty. He also did a great deal of research in the laboratory of Dr. A. T. Kinsley during that time.

After graduation from Kansas City Veterinary College in 1915, he entered into partnership with Dr. J. D. Ray and Dr. A. T. Kinsley in the Kinsley Laboratories. He served in an administrative and research capacity and began there the research and study into animal diseases which marked the beginning of his long career. His work was halted temporarily during World War I while he served as lieutenant in the Veterinary Corps, but began again in earnest on his return in 1919.

Doctor Lockhart's many important contributions to veterinary scientific knowledge are well known to all in the veterinary field. His work in developing the first biologics to control canine distemper successfully was announced in 1925. He incorporated a business (1926) in his own name for the commercial production of some of these products. He personally directed the growth of the new enter-

(*Continued on page XL*)

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WANTED: March, August and September 1954; February, March, and October 1955, and January 1956 issues of VETERINARY MEDICINE. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

VETERINARIAN

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An extensive study to determine the incidence of leptospirosis among cattle in Wisconsin has been undertaken by the state experiment station. Results of incomplete work suggest that approximately 8% of all cattle react to the agglutination-lysis test in titer considered significant to classify as positive. Of samples submitted by practitioners, where leptospirosis was suspected, 20% were positive and others suspicious.—*S. H. McNutt, D.V.M.*

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Clinical coccidiosis appears to be on the increase in large sections of the Midwest. Dr. H. L. Marsh suggests the following perscription for a lot of 100 calves:

Rx:	Iron sulphate	8 lb.
	Copper sulphate	2 lb.
	Salt	5 lb.
	Linseed oil meal	85 lb.

Spread 10 lb. over feed daily for 10 days.

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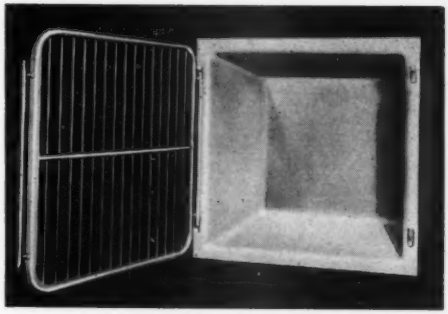

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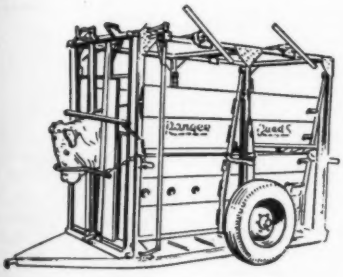

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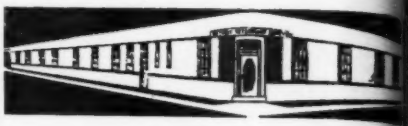

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▼ ▼ ▼

Losses due to bovine leptospirosis are estimated at approximately $1,000,000,000. annually in the United States.

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*Gray, C. W., Norden, Carl J., Jr.: Erysipelas Vaccine Avirulent (Eva)—A New Agent for Erysipelas Control. J.A.V.M.A., 127, (1955): 506-510.

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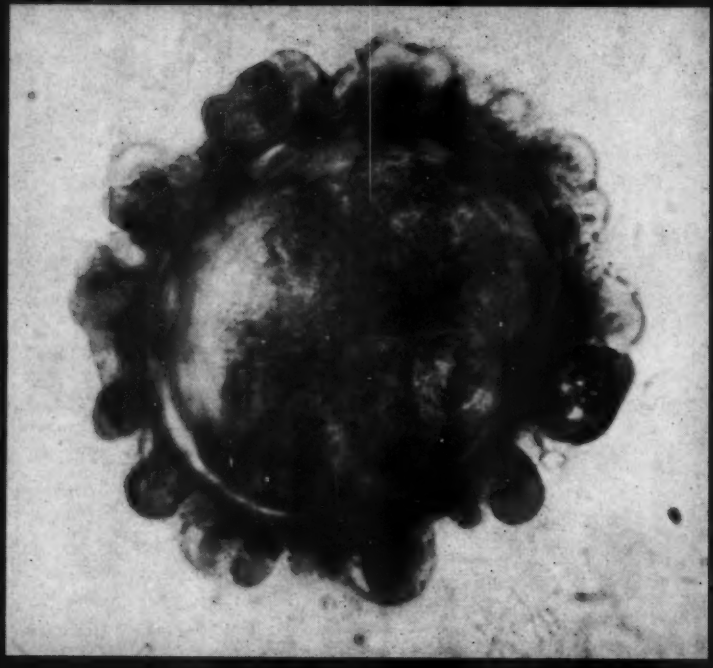

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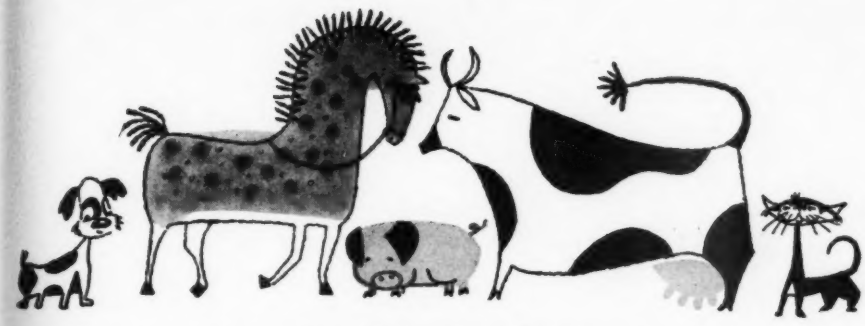

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to stop bleeding	534 small animals	accident	satisfactory results in 90% of cases[1]
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to prevent bleeding	310 dogs	surgery	clearer operative field[1]
	106 dogs and cats	dental extraction	no untoward reactions[1]
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1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.
2. Sternfels, M.: Vet. Med. *50*:82, 1955.

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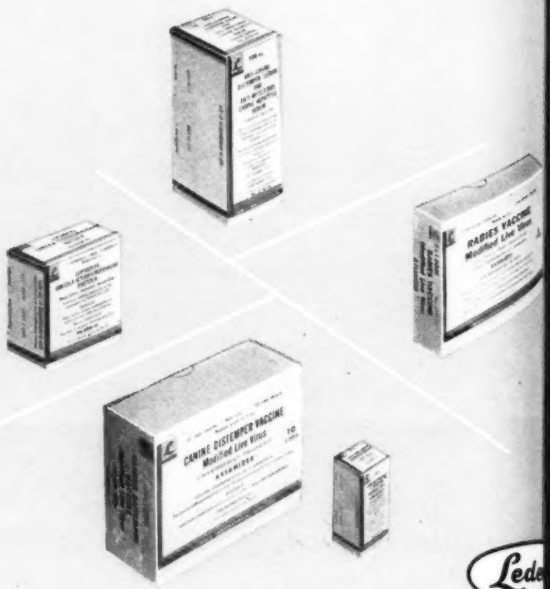

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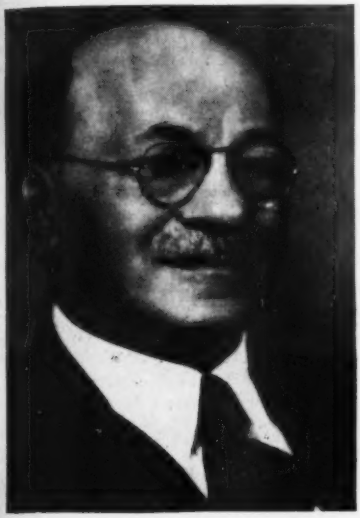
Dr. Adolph Eichhorn

1895 - 1956

Adolph Eichhorn was born at Lipto Szt., Miklos, Hungary, May 27, 1875. He attended the Royal Veterinary College of Budapest from 1892 to 1895, when he emigrated to the United States. After graduating from the New York Veterinary College in 1900, he became associated with the American Veterinary College.



Dr. Adolph Eichhorn died at his winter home in Miami Beach, on January 23, 1956.

His teaching career was continued at George Washington University in 1910-11, and at New York University from 1917 to 1921.

Doctor Eichhorn's most outstanding service was with the federal Bureau of Animal Industry, which he entered as a meat inspector March 25, 1901. He was transferred to the Pathological Division in 1906, being appointed chief bacteriologist in 1914 and chief of the division in 1915. In 1917 he resigned to become director of the Veterinary Department of the Lederle Laboratories at Pearl River, N. Y., re-entering the Bureau 21 years later as Director of the Animal Disease Station at Beltsville, Maryland. He retired from the Bureau in 1943.

His career in the public service has been marked by many contributions to veterinary literature. In collaboration with Dr. John R. Mohler, he was responsible for the translation of Hutyra and Marek's Special Pathology and Therapeutics, and Edelman's Meat Hygiene, Ernst's Milk Hygiene, and Malkmus' Clinical Diagnosis.

He introduced into this country the Laidlaw-Dunkin method for the control of canine distemper, and is credited with suggesting the relationship between canine distemper, swine influenza, and human influenza viruses.

His ability to converse in almost any language made him popular throughout the world. He held honorary membership in many foreign veterinary organizations, and throughout his professional life was a member of the A.V.-M.A.

The life of Adolph Eichhorn was a living example of the opportunity which America gives to young men of foreign birth. Friend, scholar, scientist, he was a world citizen and, as such, was recipient of the 12th International Veterinary Congress prize in 1941.

▼ ▼ ▼

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(Continued from page 143)

prise, carrying the entire responsibility for the business and financial affairs of the firm at the same time he directed its research and production activities. The firm grew steadily under his personal guidance to become one of the leading veterinary biological firms.

Perpetuation of the business for his employees, and for the continued safe-guarding of agricultural interests through the veterinary profession, was Doctor Lockhart's goal when the firm was sold in February 1955 to Cutter Laboratories of Berkeley, California. After 42 years of active effort, he gave up the active management of the firm which bears his name, but continued to serve on the Board of Directors and as consultant. He had suffered from cancer for ten years prior to his death.

With Doctor Lockhart's passing the veterinary profession lost an outstanding worker. He was a member of the Society of American Bacteriologists, the American Veterinary Medical Association, the United States Livestock Sanitary Association, an associate member of the Jackson County Medical Association, and an honorary or active member of a number of state veterinary medical associations. He was a Mason and a member of Grace and Holy Trinity Episcopal Cathedral.

Doctor Lockhart was married in Blacksburg, Virginia, in 1914, to Marguerite Mayo, daughter of Dr. N. S. Mayo. Mrs. Lockhart survives, also a sister, Mrs. W. N. Everett of Rockingham, North Carolina, and a brother, Sebor S. Lockhart, of Wadesboro, North Carolina.

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Cost of infectious bovine rhinotracheitis to Colorado cattle feeders was estimated to approach $1,500,000. in 1954.

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MEETING CALENDAR

West Virginia Veterinary Medical Association. Winter meeting. Greenbrier Hotel, White Sulphur Springs, W. Va., February 19-20, 1956. D. A. Munro, West Virginia University, Morgantown, secretary.

Missouri Veterinary Medical Association. Annual meeting. Hotel Continental, Kansas City, Mo., February 20-21, 1956. Paul L. Spencer, P. O. Box 283, Jefferson City, secretary.

Illinois State Veterinary Medical Association. Annual meeting. Hotel LaSalle, Chicago, Ill., February 20-22, 1956. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, secretary.

Colorado A. & M. Annual Conference for Veterinarians. Glover Veterinary Hospital, School of Veterinary Medicine, Colorado A. & M. College, Ft. Collins, Feb. 20-26, 1956. O. R. Adams, head Veterinary Clinics and Surgery, chairman.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., Mar. 18-20, 1956. M. K. Heath, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, secretary.

Washington State College Annual Conference for Veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., Apr. 2-4, 1956. John R. Gorman, chairman.

North Central Iowa Veterinary Medical Association. Warden Hotel, Fort Dodge, Iowa, April 19, 1956. H. Engelbrecht, Fort Dodge Laboratories, Fort Dodge, secretary-treasurer.

Eastern Iowa Veterinary Association 22nd Annual All-Day Practitioners' Clinic. Hawkeye Downs, Cedar Rapids, Ia., May 8, 1956. Forrest E. Brutsman, Traer, secretary.

American Animal Hospital Association. Annual meeting. Hotel Fontainebleu, Miami Beach, Fla., May 23-26, 1956. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Michigan State Veterinary Medical Association. Annual meeting. Bancroft Hotel, Saginaw, Mich., June 21-22, 1956. Paul V. Howard, 4011 Hunsberger, N.E., Grand Rapids, secretary.

▼ ▼ ▼

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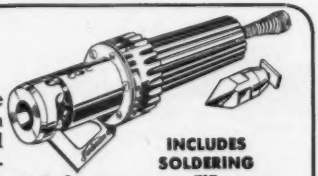

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Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., June 28-29, 1956. John D. Gadd, Cockeysville, secretary.

Mississippi State Veterinary Medical Association. Annual meeting. Buena Vista Hotel, Biloxi, Miss., July 15-17, 1956. Harvey F. McCrory, Box 536, State College, Miss., secretary.

Iowa State College Annual Conference for Veterinarians. Memorial Union, Iowa State College, Ames, Ia., July 17-18, 1956. Drs. John B. Herrick and D. L. Baker, chairmen.

Virginia Veterinary Medical Association. Semiannual meeting. Natural Bridge Hotel, Natural Bridge, Va., July 17-19, 1956. Wilson B. Bell, 1303 Hillcrest Drive, Blacksburg, secretary.

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The North Carolina Veterinary Medical Examining Board will meet at Greensboro, North Carolina, June 25, 1956. Applications for examination may be secured from the office of the secretary, James I. Cornwell, 65 Beverly Road, Beverly Hills, Asheville, North Carolina.

▾ ▾ ▾

Thorough and frequent washing with soap and water will clean up cow pox in ten days. —*J. K. Dewar, D.V.M.*

▾ ▾ ▾

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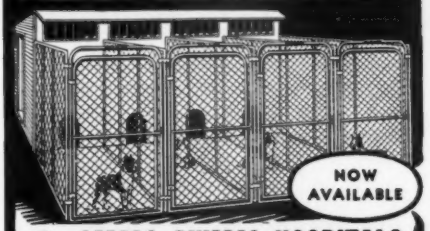

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Losses due to leptospirosis appear to be greatest in calves and other young stock.—*H. L. Marsh, D.V.M.*

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A total of 26 diseases of fowl are considered to be transmissible to man.

The sulfa drugs were the earliest chemotherapeutic agents to give veterinarians consistently effective results against animal diseases. They are still one of the mainstays of successful veterinary practice. Now there is FORSULID, bringing a greater convenience and safety, adding new value to this valuable group of drugs. FORSULID is a combination of the soluble sodium salts of four effective sulfas: sulfadiazine, sulfapyridine, sulfacetamide, sulfathiazole; brought together for a wider range of activity and lower renal toxicity; packaged for convenience in dosing and profit in dispensing.

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Supplied in packets of 12 Gm. (30 per carton) and packets of 30 Gm. (20 per carton). Sold only to veterinarians.

Drugs for Veterinary Medicine, Inc. DVM Denver, Colorado

Nation Wide D V M Silent Partner Plan

accident -- sickness -- hospitalization insurance

"Low Cost -- Sound -- Clear -- Broad coverage"

Monthly Loss of Time Benefits

	Premium
$400.00 Plan A	$172.00 year
$300.00 Plan B	$129.50 year
$200.00 Plan C	$ 87.00 year
$100.00 Plan D	$ 44.50 year

Illustration of Plan D

For loss of one hand, foot, eye, speech or hearing . . . $500 (paid in addition to monthly benefits).

Monthly benefits, total disability caused by accidents, $100 per month, for duration of such disability—up to life-time.

Monthly benefits, total disability due to sickness, $100 per month, each period of such disability, up to 24 months. Benefits payable from eighth day of disability or first day of hospital confinement. (House confinement never required in order to collect full benefits.) Number of claims not limited within any stated period or even life-time.

Protection World-Wide, wherever you go, 24 hours a day, at work or at play . . . Premium . . . $11.40 quarterly.
(Add $10 to first premium only.)

The only exclusions are war, military service, suicide, pregnancy, and flying other than as a fare-paying passenger between established airports. (Pregnancy is covered for dependent spouse after insurance is in force for 9 months as provided for under the hospital and surgical schedule coverage.) Maximum benefits for normal delivery . . . $175.

Hospital and Surgical Benefits

Insured Member, Wife and Unmarried Children (3 months to 18 years of age) receive hospital board and room at $10 per day, up to 70 days each period of hospitalization; **plus** $100 for miscellaneous hospital expense; plus surgical operation expenses from $7.50 to $225 for every member of the family, according to policy schedule.

Total Family Cost Only . . . $38.15 quarterly (including Principal Sum; Accidental Death, Dismemberment and Monthly Disability benefits for the insured veterinarian).

(Add $10 to first premium only.)

Premium cost to an insured veterinarian, with no dependents, $19.80 quarterly.

(Add $10 to first premium only.)

Your insurance costs are considerably less than any comparable individual coverage, because of the geographical spread of risk and the economies of mass administration.

Send for Brochure and fifteen good reasons why veterinarians should have this low-cost-sound-additional protection and security.

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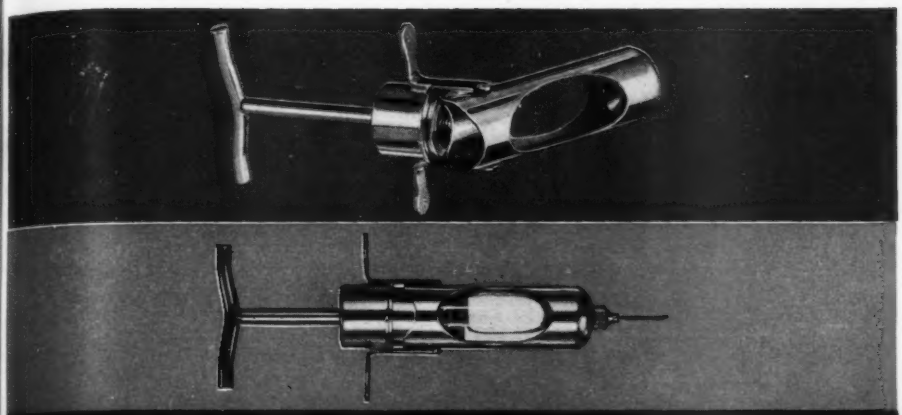
Not available in California, New York, New Jersey and Rhode Island—at present.
Series GR1394; GR1242; GP10531.



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Another Lockhart FIRST!

AUTOJET is our new one-piece cartridge syringe for use with the new Alogen and Alogen H disposable cartridges.*

- **Quick and easy to use**
- **Highly Compact**
- **Permits More Aseptic Technique**

With the AUTOJET you simply break the back of the syringe, insert cartridge and the AUTOJET is ready for use. After vaccination, discard old cartridge and repeat process for next injection. In addition to use with Alogen and Alogen H, the AUTOJET syringe is adaptable to smaller cartridge vials of Alotab (Feline Distemper Vaccine).

***ALOGEN**—Canine Distemper Vaccine in Bronchisepticus-Streptococcus Typhimurium Bacterin.

ALOGEN H—Canine Distemper and Infectious Canine Hepatitis Vaccine in Bronchisepticus-Streptococcus Typhimurium Bacterin.

ALOTAB—Feline Distemper Vaccine.

Alogen, Alogen H, and Alotab come in disposable cartridges that are **usable in the AUTOJET syringe or with old-fashioned syringes just as you would any other vial.**

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Havosept

the liquid antiseptic detergent with lubricant, deodorant, and protectant properties.

Shaker-Top Bottle

HAVOSEPT'S activity is not affected by the temperature or hardness of water. The pH of Havosept is adjusted to that of the skin. It is free of harmful alkalis and fatty acids. Thus, the veterinarian with intolerance to alkali soaps is not adversely affected by using Havosept.

HAVOSEPT is excellent for pre-operative scrubbing of both surgeon and patient. It prevents regeneration of bacterial flora. These antiseptic and protectant properties are important to you in prevention of wound contamination, and transmission of bacteria to you, the operator. Havosept is ideal as a lubricant for vaginal and rectal examination as well as for obstetrical procedures. This multi-purpose detergent also overcomes objectionable odors.

HAVER-GLOVER
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KANSAS CITY, MO.

SEE HAVER-GLOVER MESSENGER FOR FORMULA AND PRICE

- Proper herd management
- Treatment of mastitis with intramammary Furacin with or without penicillin
- Routine monthly bacteriologic tests of the milk to insure early diagnosis, treatment and cure.

A SUCCESSFUL
NEW SYSTEM
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Furacin for mastitis is available in two dosage forms:

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Procaine penicillin G and nitrofurazone in oil, a concentrated suspension of microcrystals. It contains 2 per cent Furacin and 13,333 units of procaine penicillin G per cc. in peanut oil with aluminum monostearate. Packaged in a 100 cc. vial for administration by syringe and in 7.5 cc. single dose, applicator tubes. This Gel is stable for 3 years without refrigeration, until the expiration date on the label.

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Aqueous 0.2 per cent solution of Furacin in 500 cc. rubber capped bottles. It is permanently stable.

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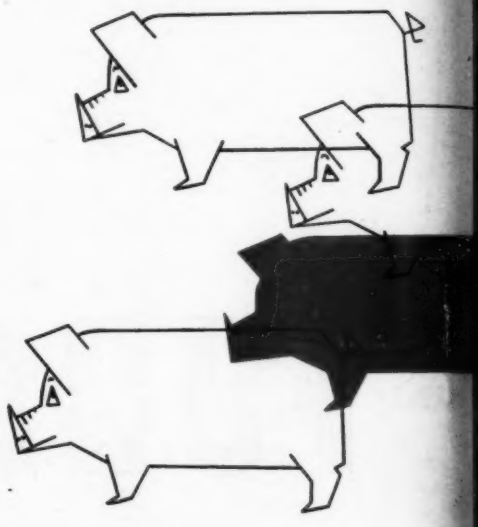

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for the doctor
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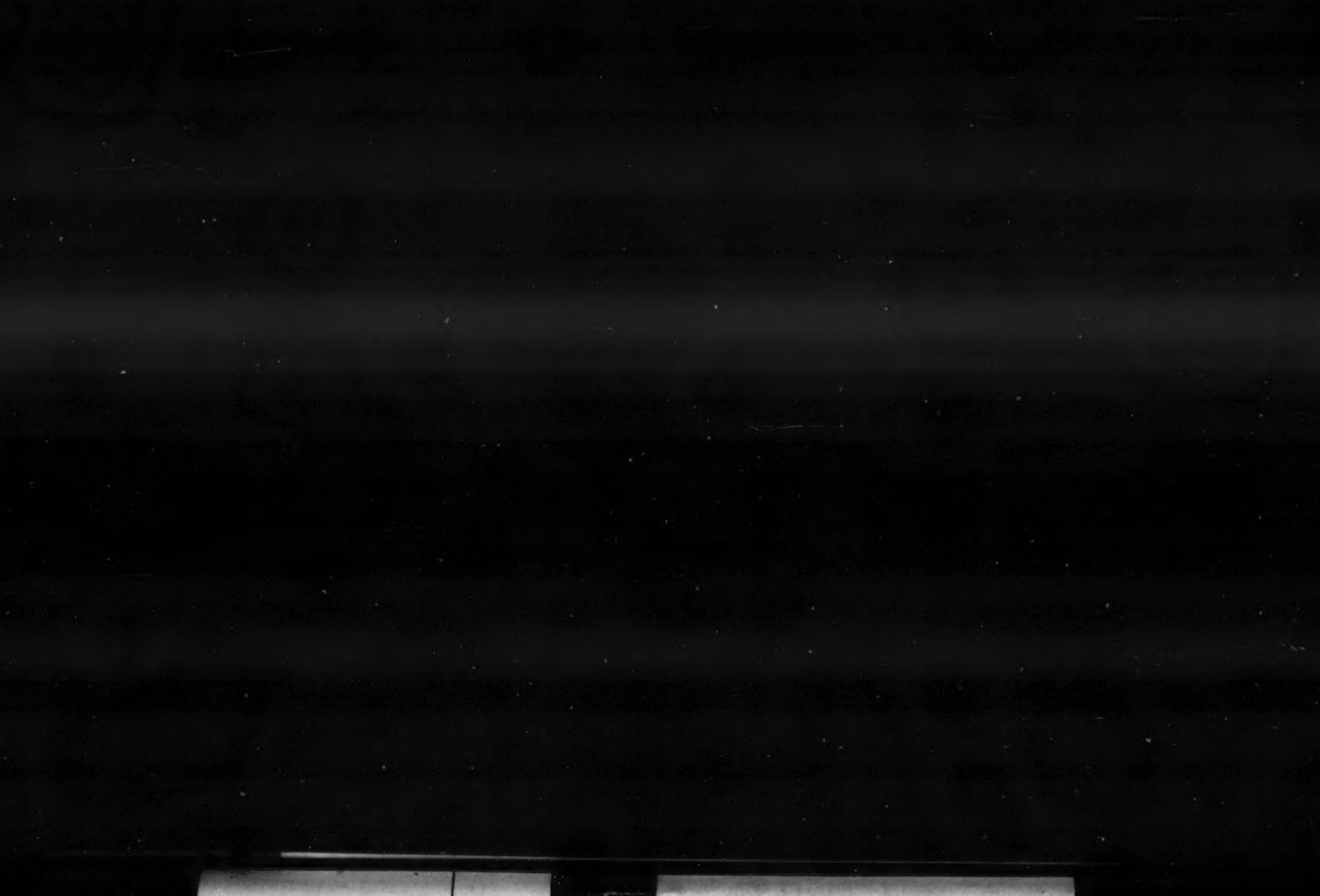
for the sow
including those in gestation

for the pigs
which can now be vaccinated at weaning age

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